

## THE BOTANY OF THE GUAYANA HIGHLAND—PART II

BASSETT MAGUIRE AND JOHN J. WURDACK,  
AND COLLABORATORS

Part I<sup>1</sup> of our report on the botany of the sandstone areas of the Guayana Highland was issued in April, 1953. By that time we had visited Tafelberg in Suriname, the Kaieteur Plateau in British Guiana; and, in Venezuela, Ilu-tepuí on the Gran Sabana, Guaiquinima on the Río Paragua, and (in Territorio Amazonas) Cerros Sípapo, Marahuaca, Duida, Huachamacari, Yapacana, Moriche, Parú, Guanay, and Camani. A list of localities, collectors, dates and exsiccatae numbers was provided for The New York Botanical Garden explorations of 1948-1951.

We have continued exploration in the Highland area to the Pakaraima region of British Guiana; to the Gran Sabana; to Cerros Yutaje and Neblina<sup>2</sup> in Venezuelan Amazonas; and to Brazilian Guayana.

In continuation of the data presented in Part I, localities and collector data for additional expeditions conducted in and since 1951, are here listed.

Localities, collectors, dates, and exsiccatae numbers  
of the 1951-56 expeditions

Cerro Guanay, Territorio Amazonas, Venezuela (expedition of Wm. H. Phelps, Jr.).

Bassett Maguire, Kathleen D. Phelps, Charles B. Hitchcock, Gerald Budowski, January 23-February 5, 1951: 31600-31789.

Cerro Camani, Territorio Amazonas, Venezuela (expedition of Wm. H. Phelps, Jr.).

Bassett Maguire, Kathleen D. Phelps, Charles B. Hitchcock, Gerald Budowski, February 12-February 17, 1951: 31790-31831.

Puerto Ayacucho, Territorio Amazonas, Venezuela.

Bassett Maguire, March 4, 1951: 31832-31836.

Santa Barbara, junction of Ríos Orinoco and Ventuari, Territorio Amazonas, Venezuela.

Richard S. Cowan and John J. Wurdack, February 21-February 23, 1951: 32000-32087.

Eagle Mountain and Mt. Ebini, Potaro River, British Guiana.

Bassett Maguire, October 12-October 18, 1951: 32088-32149.

Imbaimadai, Membaru-Kurupung, Kamarang, British Guiana.

Bassett Maguire and F. D. Fanshawe, October 21-November 18, 1951: 32150-32652.

Cerro Bolívar, Estado Bolívar, Venezuela.

Bassett Maguire, December 1-December 2, 1951: 32653-32704.

Río Paragua, Cerro Guaiquinima, Estado Bolívar, Venezuela.

Bassett Maguire, December 7, 1951-January 19, 1952: 32705-33159.

<sup>1</sup>Mem. N. Y. Bot. Gard. 8: 87-160. 1953.

<sup>2</sup>Maguire, Bassett. Cerro de la Neblina, Amazonas, Venezuela: A newly discovered sandstone mountain. Geog. Rev. 45: 27-51. 1955.

Kavanayén, Ilu-tepuí, Gran Sabana, Estado Bolívar, Venezuela.

Bassett Maguire, February 3-April 4, 1952: 33160-33749.

Kavanayén, Ptari-tepuí, Gran Sabana, Estado Bolívar, Venezuela.

Bassett Maguire, John J. Wurdack, Celia K. Maguire, December 11-December 23, 1952: 33750-34015.

Chimantá-tepuí, Gran Sabana, Estado Bolívar, Venezuela.

John J. Wurdack, January 1-February 14, 1953: 34016-34370.

Cerro Bolívar, Estado Bolívar, Venezuela.

John J. Wurdack, February 24-March 2, 1953: 34371-34477.

Cerro Yutaje, Territorio Amazonas, Venezuela.

Bassett Maguire and Celia K. Maguire, January 28-March 10, 1953: 35000-35539.

Alto Río Orinoco, Ríos Casiquiare, Negro and Guainía, Territorio Amazonas, Venezuela.

Bassett Maguire, John J. Wurdack, Celia K. Maguire, March 15-April 24, 1953: 34478-34999; 35540-35736.

Cerro Bolívar and El Pao, Estado Bolívar, Venezuela.

Bassett Maguire and John J. Wurdack, April 30-May 2, 1953; 35737-35809.

Cerro Bolívar, Estado Bolívar, Venezuela.

John J. Wurdack and George S. Bunting, October 18-October 27, 1953: 35810-36030.

Ríos Orinoco, Atabápo, Casiquiare, Guainía, Pacimoni and Yatúa, and Cerro Neblina, Territorio Amazonas, Venezuela.

Bassett Maguire, John J. Wurdack, and George S. Bunting, November 7, 1953-February 18, 1954: 36031-37714.

Serras Tepequem and do Sol (Uei-tepuí), Territorio Rio Branco, Brazil.

Bassett Maguire and Celia K. Maguire, November 19, 1954-January 7, 1955: 40000-40486.

Mt. Ayanganna, Kaieteur Plateau, British Guiana.

Bassett Maguire, W. M. C. Bagshaw, Celia K. Maguire, February 1-February 15, 1955: 40558-40701.

Chimantá-tepuí, Gran Sabana, Estado Bolívar, Venezuela.

Julian S. Steyermark and John J. Wurdack (New York Botanical Garden in cooperation with the Chicago Natural History Museum), January 8-March 16, 1955: 1-1436.

Middle Orinoco, Estados Bolívar and Apure, between Río Pargueni and Cerro Baraguan.

John J. Wurdack and J. V. Monachino, December 3, 1955-January 29, 1956: 39740-39999; 40849-41427.

Reports submitted in the following pages for the most part present studies on all collections made to date for respective families or genera. We are grateful to the specialists who have lent their talents to the review of our materials, and to our botanical colleagues in Venezuela who have lent government facility to our work.



Materials collected during the Chimantá-tepuí expeditions made independently in 1953 by John J. Wurdack and Julian A. Steyermark, and the common expedition conducted by them jointly in 1955, are reported in "Botany of the Chimantá Massif" (Mem. N.Y. Bot. Gard. 9:000-000. 1956). New taxa described in the Chimantá report, when the genus involved is treated herein, are "keyed out" in this paper.

Again we have the pleasure of acknowledging assistance given to us in the prosecution of our activities. Transportation and port facilities have, as in the past, been made available to us by Alcoa Steamship Company, Gulf Oil Corporation, Mene Grande Oil Company, National Bulk Carriers, Inc., and Sinclair Oil and Refining Company. Johnson Motor Company has again provided 15-horsepower and 25-horsepower outboard motors for river exploration. Sears Roebuck and Company continued to furnish equipment and supplies. Parke, Davis and Company maintained our medical supplies at the most efficient level for tropical exploration.

The work of this program continues with the financial support of the National Science Foundation.

### MUSCI<sup>3</sup>

*Leucobryum martianum* (Hornsch.) Hpe.

VENEZUELA: Amazonas: Cerro Duida, Río Cunucunuma. On tree trunk, north escarpment above Culebra, elev. 1400 m, Nov. 20, 1950, *Bassett Maguire, R. S. Cowan & John J. Wurdack* 29610A.

Distribution: Central America, West Indies, northern South America.

The above collection represents a rather striking form without any structural differences but distinguishable at a glance by the purple coloration. I have in the herbarium four other collections from the Cerro Duida region made by Steyermark that show the same distinctive color tinge.

*Trichostomum duidense* Bartr., sp. nov.

Dioicum, dense caespitosum, caespitibus fusciscenti-viridibus. Caulis erectus, simplex, dense foliosus. Folia sicca valde circinato-incurva, humida erecto-patentia, 3-3.2 mm longa, e basi oblonga paulum latiore sensim lineari-lanceolata, acuta, integerrima; marginibus planis; costa brevissime excurrente, dorso papillosa; cellulis laminalibus minutis, dense papillosis, basilaribus anguste rectangularibus, incrassatis, infimae laxioribus. Seta 13-16 mm longa, tenuissima; theca angustissime cylindrica, erecta vel leniter curvata, 2.5-2.7 mm long, fusciscens. Caetera ignota.

VENEZUELA: Amazonas: Cerro Duida, Río Cunucunuma. On stones, Culebra Creek, elev. 1500-1600 m, Nov. 21, 1950, *Bassett Maguire, R. S. Cowan & John J. Wurdack* 29652.

The long, slender, often slightly curved capsules are distinctive. Unfortunately the fruit is all old and deoperculate so that the peristome characters are not available, but definite vestiges of peristome-teeth have been observed in several of the capsules examined.

### GRAMINEAE<sup>4</sup>

Among the grasses of the Guayana Highland, the genus *Myriocladus* is the most remarkable. All the nineteen species known are endemic, and only one, *M.*

<sup>3</sup>By Edwin B. Bartram.

<sup>4</sup>By Jason R. Swallen; except *Andropogon* and *Paspalum*, by Ernest R. Sohns, and *Axonopus*, by George Black.

*virgatus*, has been found on more than one mountain. Six species occur on the Chimantá Massif, three on Cerro Sipapo, two each on the Cerro de la Neblina, Cerro Guaiquinima, Serranía Yutaje, and Cerro Huachamacari, and one each on Cerro Duida, Serranía Parú, Apácará-tepuí, and Churi-tepuí.

Key to species of *Myriocladus*<sup>5</sup>

- Blades not more than 17 mm long, 2 mm wide, appressed; inflorescence simple, bearing 3-5 spikelets, usually partly enclosed in the sheath.
- Rachilla pilose, the segment above the sterile lemma 1 mm long; internodes below the branches relatively short, mostly 3-4 cm long. 1. *M. gracilis*.
- Rachilla glabrous, the segment above the sterile lemma 0.5 mm long; internodes below the branches elongate, 8-12 cm long. 2. *M. steyermarkii*.
- Blades very much larger; inflorescence with few to numerous racemes.
- Blades narrowly lanceolate, the base nearly as wide as the mouth of the sheath; glumes distinctly awned.
- Racemes 2-2.5 cm long; awns of the glumes about as long as the spikelet. 3. *M. virgatus*.
- Racemes not more than 1 cm long; awns of the glumes much longer than the spikelet. 4. *M. maguirei*.
- Blades broadly rounded, the base usually petiole-like, much narrower than the mouth of the sheath; glumes awnless or short-awned (except in *M. cardonae* with spike-like inflorescence).
- Racemes few, usually less than 10.
- Panicles dense, 6-8 cm long; fertile lemmas acuminate, the first 8-10 mm long. 5. *M. neblinaensis*.
- Panicles open, 10-20 cm long, with slender, distant, ascending to spreading branches.
- Culms very slender, 45 cm to 3 m high; blades 5-7 cm long, 5-10 mm wide. 6. *M. simplex*.
- Culms relatively coarse, as much as 4 m high; blades 10-11.5 cm long, about 2 cm wide. 7. *M. exsertus*.
- Racemes numerous, usually many more than 50.
- Inflorescence dense, spike-like, about 1 cm wide, the branches very short, appressed. 8. *M. cardonae*.
- Inflorescence open, the branches ascending to spreading.
- Panicles lax, the branches very slender, at least some of them more than 10 cm long.
- Axis and branches of panicle glabrous, glandular-spotted; fertile floret 4.4 mm long; spikelets glabrous. 9. *M. longiramus*.
- Axis and branches of panicle usually densely pubescent; fertile floret not more than 4.3 mm long, usually less; glumes and lemmas distinctly hispidulous at the summit.
- Spikelets with 1 fertile floret, purple; lemmas obtuse or subobtuse. 10. *M. affinis*.
- Spikelets usually with 2 fertile florets; lemmas acute or subacute. 11. *M. parauensis*.
- Panicles rigid, erect, the branches stiffly ascending or spreading.
- Panicle-branches densely flowered to the base, simple.
- Glumes, at least the second, distinctly awned; blades of fertile culms 26 cm long, 12 cm wide. 12. *M. grandifolius*.
- Glumes awnless; blades of fertile culms 9-12 cm long, 6 cm wide. 13. *M. paraquensis*.
- Panicle-branches naked at the base or at least the lower ones bearing short, usually divergent branchlets.
- Spikelets distant, long-pedicellate, mostly 2-4 on each branch. 14. *M. variabilis*.
- Spikelets approximate, short-pedicellate, appressed, usually more than 4 on each branch.

<sup>5</sup>Not all treated in this report; some are listed in "Botany of the Chimantá Massif" (Mem. N.Y. Bot. Gard. 9:393-439. 1957).

Rachilla-joints conspicuously pilose; glumes attenuate, the tips awn-like, glabrous or scabrous. 15. *M. paludicolus*.

Rachilla-joints glabrous; glumes not awnlike, the tip hispidulous.

Panicle-branches stiffly and narrowly ascending, the lower ones distinctly longer.

Flowering culms 1-1.5 m high; panicle-axis and branches glabrous. 16. *M. confertus*.

Flowering culms about 5 m high; panicle-axis and branches densely pubescent; spikelets with 1-4 fertile florets.

17. *M. distantiflorus*.

Panicle-branches stiffly spreading, of nearly equal length.

Spikelets with 2 or 3 fertile florets, purple; first fertile lemma 5 mm long; palea about as long as the lemma, the keels glabrous. 18. *M. purpleus*.

Spikelets with 1 or 2 fertile florets; first fertile lemma 4-4.5 mm long; palea longer than the lemma, the keels sparsely ciliate. 19. *M. wurdackii*.

### 3. *Myriocladus virgatus* Swallen, Fieldiana 28(1): 34. 1950.

VENEZUELA: Savanna Hills, Cerro Duida, Terr. Amazonas, *Julian A. Steyermark* 58293 (TYPE). Common in thickets and savanna along left fork of Cano Yutaje, alt. 1300-1400 m, Cerro Yutaje, Río Manapiare, *Bassett Maguire & Celia K. Maguire* 35271. Moist wooded swale, Summit Camp to East Escarpment, alt. 1800 m, Cerro Huachamarcari, Río Cunucunuma, *Bassett Maguire, R. S. Cowan, & John J. Wurdack* 30265.

### 4. *Myriocladus maguirei* Swallen, sp. nov. Figure 3b.

Culmi fertiles summo ramis 3, elongatis; vaginae pubescentes, summo marginibus fimbriatae, suprema 15.5 cm longa lamina reducta, ligula exteriore brevissima, minute ciliata; laminae anguste lanceolatae, attenuatae, appressae, usque ad 25 cm longae, ca. 1 cm latae, glabrae; paniculae longi-exsertae, 30-34 cm longae, ca. 2 cm latae, ramis brevibus numerosis adscendentibus vel patentibus, inferioribus distantibus, ad summum condensatis, axe et ramis pubescens; spiculae 4-florae, suprema reducta; glumae quam floribus longiores, subaequales, attenuatae, usque ad 7 mm longae; lemma sterile obtusum, 2-3 mm longum, aristatum, arista 0.5-2 mm longa; lemma fertile primum 3-3.5 mm longum, acutum, marginibus hispido-ciliatum; palea lemma aequans vel superans, summo sparse pilosa vel hispida.

Type specimen consists of the top of a flowering culm with three approximate elongate branches; exposed part of sheaths 2.5-3 cm long, the upper ones longer, the uppermost of the main branch 15.5 cm long with a very much reduced blade, pubescent, with a very short minutely ciliate rim at the summit, the margins fimbriate toward the summit; ligule about 1 mm long, very minutely ciliate; blades as much as 25 cm long, very narrowly lanceolate, attenuate, about 1 cm wide at the widest part, only slightly narrower than the mouth of the sheath, appressed, very scabrous on the margins, otherwise glabrous; inflorescence long-exserted, 30-34 cm long, about 2 cm wide, the numerous short branches stiffly ascending or spreading, the lower ones somewhat distant, becoming crowded upward, the main axis and branches pubescent; spikelets 4-flowered, the upper floret rudimentary, the rachilla-joints very short, the glumes usually exceeding the florets; glumes narrow to rather broad, tapering into awns, equal, or the second longer, as much as 7 mm long; sterile lemma obtuse, 2-3 mm long, the strong midnerve excurrent in an awn 0.5-2.0 mm long; fertile lemma 3-3.5 mm long, acute, the midnerve thickened at the summit, the margins hispid-ciliate, especially near the tip; palea as long as the lemma or slightly longer, sparsely pilose or hispid at the tip, otherwise glabrous.

TYPE: infrequent, pocket thickets, Summit Peak IV, January 3, 1949, Cerro Sipapo, Terr. Amazonas, Venezuela, *Bassett Maguire & Louis Politi 28144*; U.S. National Herbarium No. 2,040,180.

5. *Myriocladus neblinaensis* Swallen, sp. nov. Figure 1.

Culmi usque ad 1.5 m alti, rhizomatosi, simplices vel nodiis superioribus ramosi; vaginae dense pubescentes, minute ciliatae, summo ligula exteriori 0.2 mm longa minute ciliata; ramorum primorum laminae 4-6 cm longae, 12-20 mm latae, breve petiolatae, appressae vel adscendentes, acutae, glabrae vel obscure pubescentes, marginibus scabrissimae; ramorum primorum paniculae 6-8 cm longae, 1-2 cm latae, densae, ramis brevibus appressis vel adscendentibus; spiculae 3-4-florae, suprema reducta; rachilla pubescens; glumae acuminatae, sparse pubescentes, marginibus ad summum minute ciliatae, prima 5-7 mm longa, secunda 7-9 mm longa; lemma sterile 8-10 mm longum, acuminatum vel aristatum, pubescens; lemma fertile 9-10 mm longum, acutum vel aristatum, pubescens vel ad basin glabrum, marginibus ciliatum; palea quam lemmate brevior, multo angustior, inter carinam pubescens, carinis hispida, summo truncata, hispida, nerviis excurrentibus.

Culms as much as 1.5 m tall from a rhizomatous base, simple or with few to several branches from the upper nodes, the branches sometimes branching and rebranching, successively with smaller blades and inflorescences, naked below the terminal crowded sheaths or with small series of shortened internodes alternate with long internodes, sometimes with a single branch from each series; branches densely pubescent; exposed portion of sheaths 1-1.5 cm long, densely crisp pubescent, the rim at the summit about 0.2 mm long, very minutely ciliate; blades of the primary branches 4-6 cm long, 12-20 mm wide, acute, abruptly rounded at the base to a short thick petiole, appressed or ascending, glabrous or obscurely pubescent, the margins very scabrous; panicles of the primary branches 6-8 cm long, usually long-exserted, 1-2 cm wide, dense, the short branches appressed or ascending, those of the secondary branches smaller, short-exserted or partly enclosed in the sheath; spikelets 3-4-flowered, the upper floret rudimentary, the fertile florets readily disarticulating, the rachilla pubescent; glumes acuminate, the first 5-7 mm long, rarely shorter, the second 7-9 mm long, sparsely pubescent, the margins minutely ciliate toward the summit; sterile lemma 8-10 mm long, acuminate or with an awn as much as 1 mm long, pubescent like the glumes; first fertile lemma 9-10 mm long, acute, sometimes with an awn as much as 1 mm long, sparsely pubescent, or glabrous toward the base, the margins ciliate in the upper half; palea shorter than the lemma (about 1 mm), much narrower than the lemma, flat or only slightly concave, pubescent between the keels, especially toward the summit, the keels hispid, the tip truncate, hispid, the nerves usually excurrent.

TYPE: occasional along escarpment overlooking Cano Grande, below Cumbre Camp, alt. 1650 m, Cerro de la Neblina, Río Yatua, Terr. Amazonas, Venezuela, January 10, 1954, *Bassett Maguire, John J. Wurdack, & George S. Bunting 37208*; U.S. National Herbarium Nos. 2,182,104, 2,182,105. Other specimens from Cerro de la Neblina: frequent in west escarpment savanna, 4-8 km. southwest of Cumbre Camp, alt. 1850-1900 m, *Bassett Maguire, John J. Wurdack, & George S. Bunting*

Explanation of figures 1, 2

FIG. 1. *Myriocladus neblinaensis* Swallen. a, branch,  $\frac{1}{2}$ ; b, spikelet,  $\times 5$ ; c, d, base and tip of blade,  $\times 5$ . FIG. 2. *Myriocladus simplex* Swallen. a, plant,  $\times \frac{1}{2}$ ; b, panicle,  $\times \frac{1}{2}$ ; c, spikelet,  $\times 5$ . (Drawings by LaVerne Helen Richardson.)







37317; occasional at edge of west escarpment savanna, 2 km north of Cumbre Camp, alt. 1800 m, *Bassett Maguire, John J. Wurdack, & George S. Bunting* 37240; frequent in savanna 5 km west of Cumbre Camp, alt. 1900 m, *Bassett Maguire, John J. Wurdack, & George S. Bunting* 37135.

6. *Myriocladus simplex* Swallen, sp. nov. Figure 2.

Culmi erecti, caespitosi, 45 cm to 3 m alti, simplices vel summo ramis brevis, internodiis elongatis 1-3; vaginae hispidulae vel subglabrae, ligula exteriore inconspicua minute ciliata, in ore fimbriatae; laminae 5-7 cm longae, 5-10 mm latae, superiores breviores, adscendentes, basi quam vagina multo angustiores, ad basin sparse pubescentes, marginibus scabrae vel glabrae; ligula 1 mm longa, arcuata, pubescens; panicula 10-20 cm longa, ramis 3-6 adscendentibus, infimo usque ad 13 cm longo, axe et ramis glabra; spiculae variabiles, floris fertilibus 1 vel 2; gluma prima 2.8-4 mm longa, angusta, minute ciliata; gluma secunda 4.5-6 mm longa, subobtrusa, ad summum minute ciliata; lemma sterile 5-6 mm longum, glumam secundam simulans; lemma fertile primum 5-6.3 mm longum, acutum summo minute ciliatum; palea quam lemmate 0.8 mm longior, truncata, summo hispidula, inter carinam ad summum minute pubescens.

Culms slender, tufted, erect, 45 cm to 3 m high, with 1-3, or possibly more, elongate internodes, alternate with single nodes or groups of much shortened internodes, simple, or the taller culms with a group of short branches at the summit; exposed portion of sheaths about 5 mm long, hispidulous, becoming glabrous or nearly so, the rim inconspicuous, minutely ciliate, the throat rounded, more or less fimbriate; blades commonly 5-7 cm long, 5-10 mm wide, or the upper ones smaller, rounded at the base, this much narrower than the mouth of the sheath but scarcely petiolate, sparsely pubescent toward the base, the margins scabrous to nearly glabrous; ligule about 1 mm long, broadly arcuate, pubescent on the back; inflorescence 10-20 cm long, sometimes less, consisting of 3-6 ascending racemes, the lowest usually remote, as much as 13 cm long, but usually shorter, with a rather large pulvinus at the base, the main axis and branches glabrous; spikelets very variable, with one or two fertile florets and a rachilla-joint, when with two fertile florets the rachilla-joint between them 0.5 mm long, thick, glabrous; first glume 2.8-4 mm long, usually narrow, minutely ciliate; second glume 4.5-6 mm long, subobtruse, minutely ciliate toward the summit, the thickened midnerve sometimes excurrent; sterile lemma 5-6 mm long, similar to the second glume; lemma of first fertile floret 5-6.3 mm long, acute, minutely ciliate near the summit, the midnerve somewhat thickened at the tip; palea exceeding the lemma as much as 0.8 mm, truncate, the tip hispidulous, minutely pubescent between the keels toward the summit.

TYPE: frequent along stream bank, right branch of Caño Yutaje, alt. 1300 m, Serranía Yutaje, Río Manapiare, Terr. Amazonas, Venezuela, February 9, 1953, *Bassett Maguire & Celia K. Maguire* 35134; U.S. National Herbarium No. 2,116,105.

7. *Myriocladus exsertus* Swallen, sp. nov. Figure 3c.

Culmi usque ad 4 m alti, ramosi; rami solitarii vel bini, elongati, erecti, graciles; vaginae glabrae vel pubescentes, in ore fimbriatae; laminae 10-11.5 cm longae, 2 cm latae, vel superiores breviores, basi subtruncatae, marginibus ad basin hispidulo-ciliatae; panicula 17-33 cm longa ramis adscendentibus, inferioribus 7-13 cm longis; spiculae 2-3-florae, distantae, pedicellis ca. 4 mm longis; gluma prima lineari-lanceolata, 2.5-3.5 mm longa, marginibus minute ciliata, summo hispidula; gluma secunda 4 mm longa, quam gluma prima latior; lemma sterile 5 mm longum, acutum, summo crassum, marginibus minute ciliatae;

lemma fertile primum 5 mm longum, lemma sterile simulans; palea quam lemmate paulo longior, inter carinam pubescens, summo hispidula.

Culms as much as 4 m tall, branching and rebranching, with or without long internodes between the branches, these single or in pairs, erect or nearly so, elongate, relatively slender; crowded sheaths extending upward on each branch for as much as 15 cm, the exposed portion of each sheath 1-1.5 cm long; sheaths glabrous or appressed pubescent, with a short, minutely ciliate rim at the summit, fimbriate in the throat; blades 10-11.5 cm long, 2 cm wide, or the upper ones smaller, acute, broadly rounded or subtruncate at the base, the margins hispidulous-ciliate toward the base, scabrous upward; inflorescence 17-33 cm long, with relatively few long ascending branches, the lower ones 7-13 cm long, the axis, branches, and pedicels glabrous; spikelets 2- or 3-flowered, distant, the pedicels about 4 mm long; first glume linear-lanceolate, 2.5-3.5 mm long, the margins minutely ciliate nearly to the base, the tip rounded, hispidulous; second glume 4 mm long, similar to the first but broader; sterile lemma 5 mm long, acute, blunt, the midnerve thickened at the tip, the margins minutely ciliate; first fertile lemma 5 mm long, similar to the sterile lemma; palea slightly longer than the lemma, pubescent between the nerves, the tip hispidulous.

TYPE: occasional, Summit Camp to Southwest Escarpment, alt. 1850 m, Cerro Huachamacari, Río Cunucunuma, Terr. Amazonas, Venezuela, December 17, 1950, *Bassett Maguire, R. S. Cowan, & John J. Wurdack* 30295; U.S. National Herbarium No. 2,040,226.

8. *Myriocladus cardonae* Swallen, *Fieldiana* 28(1): 35. 1950. Figure 3d.

VENEZUELA: Cumbre del Cerro Acopán, (Chimantá-tepui), Bolívar, *Felix Cardona* 2307.

9. *Myriocladus longiramosus* Swallen, sp. nov. Figure 3e.

Culmi 3-5 m alti, summo ramis 4 usque ad 2 m longis; ramorum vaginae inferiores (pars manifestus) 2.5 cm longae, superiores longiores, suprema elongata; laminae 11-16 cm longae, 2.5-5.0 cm latae, basi subtruncatae, glabrae, marginibus scabrae; paniculae 40-55 cm longae, multiramosae, ramis adscendentibus, inferioribus 9-14 cm longis, subremotis, ad summum brevioribus et densioribus; spiculae 3-florae, suprema reducta secreta, pedicellis 2-3 mm longis appressis; rachilla scabra, inter flosculos 0.4-0.5 mm longa; gluma prima angusta, 2-2.7 mm longa; gluma secunda latior 2.8-3.5 mm longa; lemma sterile 3 mm longum, obtusum, glabrum; lemma fertile primum 4.4 mm longum, obtusum, glabrum; palea obtusa, lemma superans, concava, glabra, vel apice pubescens.

Culms 3-5 m tall; branches four together, the longest nearly 2 m long with a group of shortened internodes in the middle; exposed portion of sheaths at the base of the branches about 2.5 cm long, the upper ones longer, or the uppermost elongate; blades 11-16 cm long, 2.5-5.0 cm wide near the rounded subtruncate base, much narrower than the mouth of the sheath, the margins scabrous, otherwise glabrous; inflorescence 40-55 cm long, with numerous rather stiffly ascending branches, the lower ones 9-14 cm long, somewhat distant, becoming shorter and more crowded upward; spikelets 3-flowered, the upper rudimentary, usually hidden between the fertile florets, the pedicels 2-3 mm long, appressed; rachilla-segment below first fertile floret thick, 0.4 mm long, sparsely scabrous, the segment below the second floret 0.5 mm long, slender, scabrous; first glume narrow, 2-2.7 mm long, the tip blunt; second glume 2.8-3.5 mm long, somewhat broader than the first; sterile lemma 3 mm long, obtuse, glabrous, the midnerve thickened at the tip, sometimes slightly excurrent; lemma of first fertile floret 4.4 mm long, obtuse, glabrous, the midnerve thickened at the tip; palea obtuse,

0.5 mm longer than the lemma, deeply concave, glabrous, or obscurely pubescent at the tip.

TYPE: occasional in thickets and on rocky elevations 1 km south of Cumbre Camp, alt. 1800 m, Cerro Guaiquinima, Río Paragua, Bolívar, Venezuela, December 29, 1951, *Bassett Maguire* 32822; U.S. National Herbarium No. 2,078,761.

10. *Myriocladus affinis* Swallen, sp. nov. Figure 3f.

Culmi 3-5 m alti, summo 2-6 ramosi, internodio primario 1-2 m longo; rami 90-100 cm longi; vaginarum pars manifestus 2-3 cm longus, glabrus vel sparse pubescens, subtruncatus, in ore fimbriatus; laminae 17-24 cm longae, 3.5-5 cm latae, basi 6-8 mm latae, vix petiolatae, glabrae, marginibus scabrae; inflorescentia 50-70 cm longa, densa, multiramosa, ramis anguste adscendentibus, 6-8 cm longis, ad summum brevioribus et densioribus; axis, rami, et pedicelli dense pubescentes; spiculae purpureae, lemmate fertile 1, pedicellis 2-3 mm longis, appressis; gluma prima 2-2.6 mm longa, angusta, subacuta, in carina hispidula, marginibus ciliata; gluma secunda 2.5-4 mm longa, subacuta vel subobtusa, apice hispidula vel arista breve hispidula, summo marginibus ciliata; lemma sterile 3.5-3.8 mm longum, subobtusum, mucronatum, apice hispidulum; lemma fertile lemma sterile simulans, 3.8-4.1 mm longum; palea 2.6 mm longa, quam lemmate multo angustior.

Culms 3-5 m high, the main internode 1-2 m long, bearing 2-(6) branches at the summit, with a group of much shortened internodes for a distance of about 30 cm below the branches; branches 90-100 cm long; exposed portion of sheath 2-3 cm long, glabrous or sparsely pubescent, the rim at the summit 0.2 mm long, minutely irregular, the throat rounded, fimbriate; ligule 0.5 mm long, truncate, thick, glabrous; blades 17-24 cm long, 3.5-5 cm wide or the upper ones smaller, abruptly rounded at the base, glabrous on both surfaces, the margins scabrous to nearly smooth, the junction with the blade 6-8 mm wide, scarcely petiolate; inflorescence 50-70 cm long, rather dense, with numerous slender, narrowly ascending branches, commonly 6-8 cm long, much shorter and more crowded toward the summit, the main axis, branches, and pedicels densely pubescent; spikelets dark purple with 1 fertile floret and a rudiment, the pedicels 2-3 mm long, appressed; first glume 2-2.6 mm long, narrow, subacute, rarely with a short hispidulous awn, the nerve hispidulous, the tip densely so, the margins usually ciliate; second glume 2.5-4 mm long, subacute, the tip hispidulous, or subobtuse with a short hispidulous awn, the margins ciliate at the summit; sterile lemma 3.5-3.8 mm long, subobtuse, the tip hispidulous, usually mucronate; lemma of fertile floret 3.8-4.1 mm long, similar to the sterile lemma; palea 2.6 mm long, much narrower than the lemma.

TYPE: occasional about thickets, borders of woodlands, and rocky elevations, Cumbre Camp, alt. 1800 m, Cerro Guaiquinima, Río Paragua, Bolívar, Venezuela, December 28, 1951, *Bassett Maguire* 32792; U.S. National Herbarium No. 2,078,760.

11. *Myriocladus paruenis* Swallen, sp. nov. Figure 3g.

Culmi usque ad 5 m alti, glabri, in parte inferiore efoliosi; rami foliosi 2 vel 3, 0.6-1.7 m longi; culmorum sterilium laminae 45 cm longae, 9 cm latae, marginibus scabrae vel hispidulo-ciliatae; panicula 60-80 cm longa, racemis numerosis gracilibus adscendentibus, inferioribus usque ad 18 cm longis in parte inferiore ramulis brevibus; spiculae 2-3-florae, suprema reducta, pedicellis 2-4 mm longis glabris vel pubescentibus; gluma prima angusta 2-3 mm longa, summo compressa, hispidula; gluma secunda 2.5-5 mm longa, summo hispidula; lemma sterile glumam secundam simulans; flosculorum primorum lemma 4.0-4.3 mm longum, subobtusum, summo et marginibus plus minusve hispidulum; palea obtusa quam lemmate 0.5 mm longior; rachilla pubescens.



Culms as much as 5 m tall, leafless for as much as 3 m, solid, glabrous; leafy branches 2 or 3 together, 0.6-1.7 m long; sheaths about 9 cm long, the exposed portion mostly 1.5-3 cm long; blades of the sterile culms 45 cm long, about 9 cm wide near the rounded clasping base, not cordate, one margin thickened, rounded, scabrous, the other flattened, hispidulous-ciliate; inflorescence 60-80 cm long, with numerous narrowly ascending to somewhat spreading, rather slender racemes, the lower ones as much as 18 cm long, bearing short rather distant branchlets in the lower half, the axis nearly glabrous, the branches and branchlets sparsely to densely pubescent especially toward the base; spikelets 2-3-flowered, the upper floret reduced or rudimentary, the pedicels 2-4 mm long, appressed, glabrous or usually pubescent; first glume narrow, 2-3 mm long, the tip flat or laterally compressed, hispidulous; second glume 2.5-5 mm long, including the laterally compressed hispidulous tip from very short to as much as 1 mm long; sterile lemma similar to the second glume, equaling it or somewhat longer; lemma of first fertile floret 4.0-4.3 mm long, subobtuse, the midnerve thickened and sometimes rounded at the tip, the tip and sometimes the margins more or less hispidulous; palea obtuse, exceeding the lemma 0.5 mm; rachilla pubescent, the joint 0.5 mm long, rather stout, the second more slender, 1.0 mm long.

TYPE: West Rim north of Camp Caño, elev. 2000 m, Serranía Parú, Río Parú, Caño Asisa, Río Ventuari, Terr. Amazonas, Venezuela, January 31, 1951, R. S. Cowan & John J. Wurdack 31076; U.S. National Herbarium Nos. 2,040,247 and 2,040,248.

12. *Myriocladus grandifolius* Swallen, sp. nov. Figure 3h.

Culmi usque ad 3 m alti; culmorum fertilium rami 2.4 m longi, basi 1.5 cm crassi; vaginae glabrae, in ore fimbriatae; ligula exteriore crassa, glabra, irregularis; ligula 1 m longa, glabra, truncata; laminae 26 cm longae, 12 cm latae, subcordatae, epetiolatae, acrae, glabrae, marginibus obscure scabrae; panicula 68 cm longa, ca. 8 cm lata, racemis numerosis anguste adscendentibus vel patentibus, 4-6 cm longis vel ad summam brevioribus, axe dense pubescens; spicula floribus fertilibus 2; gluma prima angusta, pubescens, ad summam hispidula; gluma secunda latior, 5-6 mm longa, pubescens, abrupte acuta, arista 2 mm longa; lemma sterile 4.5 mm longum, glabrum, glumam secundam simulans; lemma fertile primum 5.5-5.7 mm longum, acutum, glabrum, summo hispidulum, marginibus minute ciliatum; palea quam lemmate angustior, 3 mm longa, inter carinam pubescens, summo hispidula nerviis minute excurrentibus.

Culms as much as 3 m high; flowering branch 2.4 m long, about 1.5 cm thick at the base (including the persistent sheaths); exposed portion of sheaths about 3 cm long, glabrous, fimbriate in the throat, the rim thick, irregular, glabrous; ligule 1 mm long, glabrous, truncate; prophyllum broad, conspicuous, extending 2 cm above the sheath; blades 26 cm long, about 12 cm wide toward the base, subcordate, the junction with the sheath 2 cm wide, not petiolate, glabrous, the tip acute, the margins glabrous or obscurely scabrous; inflorescence long-exserted, 68 cm long, about 8 cm wide, the very numerous, relatively stout branches spikelet-bearing to the base, narrowly ascending to spreading, mostly 4-6 cm long, shorter and denser toward the summit, solitary or usually arranged in groups of two or three, a densely pubescent pulvinus at the base, the axis and branches densely pubescent; spikelets immature, apparently with two fertile florets and a rudiment, the rachilla scabrous, the segment above the sterile lemma 0.5 mm long, the segment above the fertile floret 1 mm long; first glume narrow, tapering, pubescent on the back, hispidulous toward the tip; second glume broader, somewhat abruptly narrowed above, 5-6 mm long including the awnlike tip as much as 2 mm long, pubescent on the back, hispidulous toward the tip; sterile lemma 4.5

mm long, similar to the second glume but glabrous on the back, the awnlike tip as much as 1 mm long; lemma of first fertile floret 5.5-5.7 mm long, acute, rarely with an awnlike tip 0.5 mm long, glabrous on the back, more or less hispidulous at the tip, the margins minutely ciliate; palea much narrower than the lemma, 3 mm long, sparsely pubescent between the keels, the nerves minutely excurrent, the tip hispidulous between the nerves.

TYPE: infrequent, thickets bordering stream, Lower Caño Negro, Cerro Sipapo (Paráque), Terr. Amazonas, Venezuela, January 1, 1949. *Bassett Maguire & Louis Politi 28101*; U.S. National Herbarium Nos. 2,040,184, 2,040,185.

13. *Myriocladus paraquensis* Swallen, sp. nov. Figure 3i,j.

Culmi usque ad 5 m alti; culmi sterile: vaginae 9.5 cm longae, scaberulae, in ore fimbriatae, ligula exteriore 1 mm longa, crassa, erosa; laminae 42 cm longae, 11.5 cm latae, acuminatae, subcordatae, marginibus scabrae; culmorum fertilium rami 100-135 cm longi; laminae 9-12 cm longae, ca. 6 cm latae, suprema brevior; panícula 42-48 cm longa racemis numerosis rigide adscendentibus, inferioribus 3.5-4.5 cm longis, axe et ramis dense pubescens; spiculae brevipedicellatae, appressae, floribus fertilibus 1 vel 2; glumae acutae vel acuminatae, pilosae, prima 2-2.8 mm longae, secunda latior 3.2-4.5 mm longa; lemma sterile 3-3.5 mm longum, acutum vel subobtusum, interdum mucronatum; lemma fertile primum 5-5.5 mm longum, acutum vel mucronatum, glabrum, marginibus ciliatum; palea quam lemmate longior vel brevior, concava, inter carinam sparse pubescens, summo angusta, truncata, hispidula, nerviis minute excurrentibus; rachilla crassa, pubescens.

Culms as much as 5 m high; sterile culms 1.4 cm thick, hollow; sheaths about 9.5 cm long, scaberulous, the rim about 1mm long, thick, erose, fimbriate in the throat with long curly hairs; blades of sterile culms 42 cm long, 11.5 cm wide, the tip acuminate, broadly rounded, subcordate at the base, the margins scabrous; branches of flowering culms 100-135 cm long, the blades 9-12 cm long, about 6 cm wide, or the uppermost smaller; inflorescence 42-48 cm long, with numerous stiffly ascending racemes, the lower ones rather distant or approximate, 3.5-4.5 cm long, becoming shorter and crowded toward the summit, the axis and branches densely pubescent; spikelets with 1 or 2 fertile florets, short-pedicellate, appressed; glumes acute or acuminate, pilose, the first 2-2.8 mm long, rarely less, the second somewhat broader 3.2-4.5 mm long; sterile lemma 3-3.5 mm long, acute or subobtusum, sometimes mucronate, pilose only at the summit; lemma of first fertile floret 5-5.5 mm long, acute, sometimes mucronate, glabrous, usually finely ciliate on the margins; palea a little shorter to a little longer than the lemma, concave, sparsely pubescent between the keels, the tip narrow, truncate, hispidulous, the nerves minutely excurrent; rachilla rather thick, pubescent, the segment above the sterile lemma 0.5 mm long, the one above the first fertile lemma 2 mm long.

TYPE: common, cliffs above Savanna Camp, Cerro Sipapo (Paráque), Terr. Amazonas, Venezuela, January 17, 1949, *Bassett Maguire & Louis Politi 28395*; U. S. National Herbarium Nos. 2,040,181, 2,040,182, and 2,040,183.

15. *Myriocladus paludicolus* Swallen, sp. nov. Figure 4b.

Culmi fertiles 0.3-1 m alti; culmi steriles usque ad 8 m alti; vaginae 4-5 cm longae, condensatae, auriculis fimbriatis, ligula exteriore breve, crassa, glabra vel minute ciliata; culmorum sterilium laminae 30 cm longae, 10.5 cm latae, subcardatae; culmorum fertilium laminae 9-16 cm longae, 4-6 cm latae, vel





FIG. 3. Spikelets of *Myriocladus* Swallen;  $\times 5$  except *f* and *b*  $\times 8$ . *a*, *M. steyermarkii*; *b*, *M. maguirei*; *c*, *M. exsertus*; *d*, *M. cardonae*; *e*, *M. longiramosus*; *f*, *M. affinis*; *g*, *M. paruensis*; *h*, *M. grandifolius*; *i*, *j*, *M. paraquensis*. (Drawings by LaVerne Helen Richardson except *f* and *b*.)

suprema brevior, abrupte acuminatae, glabrae, marginibus crassis albidis; paniculae pyramidatae, usque ad 40 cm longae, basi 12 cm latae, ramis adscendentibus vel patentibus ramulis divergentibus in parte inferioribus, axe dense pubescentes vel pilosae; spiculae 3-4 florum, suprema reducta; rachilla pubescens vel pilosa; gluma prima angusta, acuminata, 4-4.5 mm longa; gluma secunda latior, acuminata, 6-8 mm longa; lemma sterile 5 mm longum, abrupte acuminatum; lemma fertile primum 5.5 mm longum, obtusum vel subobtusum, glabrum vel ad marginem sparse pilosum, summo carina crassa, interdum mucronatum; palea lemma aequans vel superans.

"Fertile canes 0.3-1 m (high); sterile canes to 8 m." Sheaths 4-5 cm long, crowded, glabrous, with a short, thick, glabrous or very minutely ciliate rim at the summit, somewhat auriculate, the auricles bearing crowded curly bristles; blades of the sterile culms as much as 30 cm long, 10.5 cm wide at the base, truncate or subcordate; blades of the flowering culms 9-16 cm long, 4-6 cm wide, or the uppermost of the branches smaller, rather abruptly acuminate, glabrous; with rather prominent thick whitish margins, the cross-veins plainly visible on the lower surface; inflorescence pyramidal, as much as 40 cm long, 12 cm wide at the base, the branches stiffly ascending or spreading, bearing short divergent branchlets in the lower half, the axis, branches, and pedicels rather densely pubescent or pilose; spikelets 3-4-flowered, the upper floret reduced or rudimentary, the rachilla-joints pubescent or pilose at least toward the summit; first glume narrow, acuminate, 4-4.5 mm long; second glume broader, acuminate, 6-8 mm long; sterile lemma 5 mm long, abruptly acuminate; lowest fertile lemma 5.5

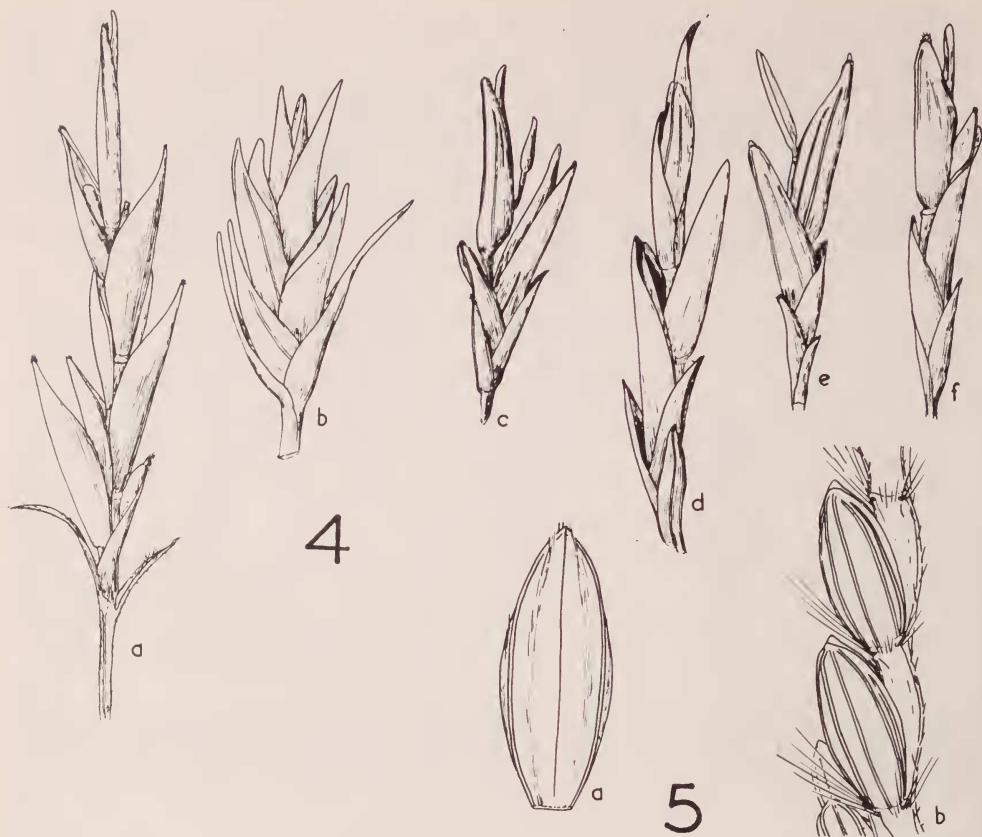


FIG. 4. Spikelets of *Myriocladus* Swallen;  $\times 5$ . a, *M. variabilis*; b, *M. paludicolus*; c, *M. confertus*; d, *M. distantiflorus*; e, *M. purpureus*; f, *M. wurdackii*. FIG. 5. a, *Axonopus maguirei* Black, spikelet,  $\times 15$ ; b, *Axonopus suffultiformis* Black, portion of rachis with spikelets,  $\times 10$ . (Drawings by LaVerne Helen Richardson.)

mm long, obtuse or subobtuse, glabrous or sparsely pilose near the margins, the midnerve thickened at the summit, sometimes excurrent in a short mucro; palea as long as or slightly longer than the lemma, glabrous, or sparsely pilose between the keels.

**TYPE:** locally frequent on open headland, 7 km north of Cumbre Camp, alt. 1900 m, Cerro de Neblina, Río Yatua, Terr. Amazonas, Venezuela, January 10, 1954, *Bassett Maguire, John J. Wurdack, & George S. Bunting* 37200; U. S. National Herbarium Nos. 2,182,101 and 2,182,102.

17. *Myriocladus distantiflorus* Swallen, sp. nov. Figure 4d.

Culmi usque ad 5 m alti; rami floriferi ca. 80 cm longi; vaginae ligula exteriore 0.4 mm longa, minute ciliata vel glabra, in ore fimbriatae, subtruncatae; ligula brevis in costa hispida; panicula ca. 65 cm longa, .7 cm lata, densa, ramis numerosis adscendentibus usque ad 10 cm longis, inferioribus ramulis appressis vel divergentibus; spiculae 1-4-florae; rachilla gracilis, glabra; glumae 2-3 mm longae, angustae, summo hispidulae; gluma secunda et lemma sterile subaequalia, 3-4 mm longa, glumam primam simulans vel lemma sterile obtusum, mucronatum; lemma fertile 5-5.5 mm longum, obtusum vel subobtusum, rare mucronatum, glabrum; palea quam lemmate longior vel brevior, summo minute hispidula.

Culms as much as 5 m high; flowering branch about 80 cm long; blades unknown (all fallen); exposed portion of sheath 1.5–2.0 cm long, the uppermost 4 cm, the rim 0.4 mm long, firm, the margin irregular, minutely ciliate or glabrous, the throat subtruncate, fimbriate; ligule short and firm, hispid on the back; panicle 65 cm long, about 7 cm wide at the middle, dense, with numerous stiffly ascending branches as much as 10 cm long, becoming shorter and denser toward the summit, at least the lower ones with relatively short appressed or somewhat spreading branchlets, the main axis and branches pubescent; spikelets with 1–4 distant fertile florets (commonly 3), the rachilla slender, glabrous, the segment above the sterile lemma about 0.5 mm long; first glume 2–3 mm long, narrow, the tip hispidulous; second glume and sterile lemma subequal, 3–4 mm long, rarely longer or shorter, similar to the first glume, or the sterile lemma occasionally obtuse, mucronate; fertile lemma 5–5.5 mm long, obtuse or subobtuse, glabrous, rarely mucronate; palea as long as the lemma, sometimes shorter, or longer in the upper florets, the tip minutely hispidulous.

TYPE: Cumbre of Cerro Apacará, Río Caroni, alt. 2300 m, Chimantá Massif, Bolívar, Venezuela, November 11, 1946, *Cardona* 1972.

*Neurolepis angusta* Swallen, sp. nov.

Culmi erecti 2.5 m alti; foliarum inferiorum vaginae confertae usque ad 35 cm longae, auriculatae, fimbriatae, marginibus tenuibus; ligula ca. 1 cm longa; laminae 165 cm longae, 6.5 cm latae, acuminatae, marginibus plus minusve scabrae, petiolo crasso, duro, sulcato, 50 cm longo; foliarum culmorum vaginae elongatae, solutae, laminae 80 cm longae, 6 cm latae, epetiolatae; panícula 75 cm longa, 2.5–3 cm latae, densae, ramis rigide adscendentibus inferioribus 4 cm longis, ad summum paniculae brevioribus et densioribus, ramulis brevibus appressis vel plus minusve divergentibus; spiculae 8–9 mm longae, brevipedicellatae; glumae et lemmata sterilia obtusa, apiculata; gluma prima 1–1.5 mm longa; gluma secunda 2–2.5 mm longa; lemma sterile primum 3–4.5 mm longum; lemma fertile arista 1.5–2 mm longa, valida, acri; palea lemma subaequans, obtusa.

Perennial; culms erect, hollow, thin-walled, more than 2.5 m high; basal leaves: sheaths crowded, as much as 35 cm long, auriculate, the auricles long-fimbriate, the very thick back rounded, the margins thin; ligule about 1 cm long, the fibrous membrane behind it as much as 3 cm long; blades 165 cm long (including the petiole), 6.5 cm wide, more or less scabrous on the margins, acuminate, long-attenuate to a thick, hard, sulcate, petiole-like base about 50 cm long; culm leaves: sheaths loose, elongate, the back scarcely thickened, the fimbriate auricles less conspicuous; blades about 80 cm long, 6 cm wide, apparently persistent, gradually narrowed toward the base but not petiolate; panicle 75 cm long, mostly 2.5–3 cm wide, dense, the branches stiffly ascending, the lower ones about 4 cm long, somewhat distant, becoming shorter and densely crowded toward the summit, mostly with short appressed or somewhat spreading branchlets; spikelets 8–9 mm long, short pedicellate; glumes and sterile lemmas usually obtuse, apiculate, less frequently acute or obtuse only; first glume 1–1.5 mm long; second glume 2–2.5 mm long; first sterile lemma 3–4.5 mm long; second sterile lemma 4.5–5 mm long; fertile lemma tapering into a stout, smooth, sharp-pointed awn 1.5–2 mm long; palea about as long as the lemma, blunt, not keeled, the nerves not evident.

TYPE: abundant in open places in low brush on cumbre slopes, saddle between North Peak and central plateau, alt. 2300–2600 m, Ilu-tepuí, Gran Sabana, Bolívar, Venezuela, March 15, 1952, *Bassett Maguire* 33412; U.S. National Herbarium Nos. 2,078,769, 2,078,770.

*Thrasya guianensis* Swallen, sp. nov.

Perennis; culmi erecti, ramosi, ca. 90 cm alti; vaginae internodiis paulum longiores vel breviores, ad summum pilosae marginibus ciliatae; ligula 1-2 mm longa, fusca; laminae 8-18 cm longae, 4-6 mm latae, subattenuatae, dense pilosae; inflorescentiae terminales et axillares; racemi 1 vel 2, 4-11 cm longi; rachis 1 mm lata, marginibus scabra, pilis paucis rigidis longis; spiculae 1.6-1.8 mm longae, obtusae, pedicellis brevibus dense pubescentibus; gluma prima 0.3 mm longa, obtusa, enervis; gluma secunda obtusa fructu 1/3 brevior vel fructum subaequans; lemma sterile fructum aequans, glabrum vel sparse pilosum; fructus obtusus, albus, papillosus.

Perennial; culms erect, branching from most of the nodes, about 90 cm high; sheaths a little longer or shorter than the internodes, pilose toward the summit, the margins ciliate; ligule 1-2 mm long, brown; blades 8-18 cm long, 4-6 mm wide, subattenuate, somewhat narrowed toward the base, densely pilose; inflorescences terminal and axillary, with usually solitary or sometimes 2 racemes 4-11 cm long; rachis 1 mm wide, the margins scabrous and with scattered long stiff hairs; spikelets 1.6-1.8 mm long, obtuse, the short pedicels densely pubescent; first glume 0.3 mm long, obtuse, nerveless; second glume obtuse  $\frac{2}{3}$  as long to nearly as long as the fruit; sterile lemma equaling the fruit, glabrous or occasionally sparsely pilose; fruit obtuse, white, strongly papillose.

TYPE: dominant caespitose grass of burnt savanna, Sagaraimada, alt. 550 m, Upper Mazaruni River, British Guiana, November 16, 1951, *Bassett Maguire & D. B. Fanshawe 32621A*; U. S. National Herbarium No. 2,078,799.

*Axonopus rivularis* Black, sp. nov.

Perennis, foliis laxis; culmi 75-90 cm longi, 1-2 mm crassi, teretes vel vix compressi; nodi 1-2, pilosi; vaginae 10-35 cm longae, superiores longiores, 1-3 mm latae, dorso rotundatae, cataphyllis 1-3 mm longis, ad basin nonnumquam a culmis solutae, internodiis breviores, glabrae, summo ciliatae; ligula 0.3-0.4 mm longa, ciliata; laminae 10-30 cm longae, 0.5-1.0 cm latae, planae, lineari-lanceolatae nervo mediano prominulo, longe-acuminatae, ad basin dense pilosae, subtus sparse pilosae pilis longis, supra glabrescentes; inflorescentiae terminales, pedunculis 2-4, ca. 30-40 cm longis; paniculae 15-25 cm longae; racemi 2-3, divergentes, ca. 10-20 cm longi, axilla dense molliter pilosa, interdum pilis longioribus adpersis; rhachis 0.3-0.4 mm lata, viridescens, glabra vel scabrida, flexuosa, in 25 mm 10-11 spiculis praedita; spiculae 3.2-3.3 mm longae, 0.7-0.8 mm latae, lineari-lanceolatae, obtusae; gluma et lemma sterile aequalia, 5-7-nervia, nervis prominulis ad apicem productis, inter nervos adpresse et sparse pilosa; pedicellus brevissimus; flosculus 2.0-2.1 mm longus, albidus, obtusus, ad apicem dense breviter molliterque pilosus.

Erect or spreading perennial, leafy throughout, the foliage lax; culms 75-90 cm tall, 1-2 mm thick, terete or slightly compressed, often reddish or purplish; nodes 1-2, 1-3 mm long, appressed-pilose, often glabrescent; sheaths 10-35 cm long, the upper ones longest, 1-3 mm wide, not keeled, sometimes remote from the culm, glabrous or ciliate toward the summit, shorter than the internodes, some reduced to cataphylls 1-3 cm long; ligule 0.3-0.4 mm long, ciliate, the crown often longer than the base; collar hairy on either side, the wedge-shaped area distinct; blades 10-30 cm long, 5-10 mm wide, broadest at the middle, flat, acuminate, the midnerve prominent, the margins scabrous, long-ciliate at the base, densely hairy on the under surface, glabrescent above with a few long hairs just above the ligule, the base equal to the width of the sheath or slightly broader; inflorescence terminal; peduncles 2-4, 15-25 cm long, usually red-tinged; panicles 15-25 cm



long; racemes 2-3, widely divergent, 10-20 cm long, the axils densely short-hairy with a few to several long hairs often intermixed; rachis 9.3-0.4 mm wide, greenish, glabrous or scabrous, flexuous, sharply triquetrous; spikelets 10-11 per 25 mm, 3.2-3.3 mm long, 0.7-0.8 mm wide, linear-lanceolate, obtuse, the pedicels 0-0.2 mm long; glume and sterile lemma equal, 5-7-nerved, the nerves meeting at the apex, sparsely pilose between the nerves; fertile floret 2-2.1 mm long, pale yellow or white, obtuse, with a tuft of short crowded hairs at the apex.

TYPE: frequent, Danto Paso, wet banks along rocks, Danta Falls, Río Cuao, Río Orinoco, Terr Amazonas, Venezuela, alt. 150 m, November 20, 1948, *Bassett Maguire & Louis Politi* 27349; U. S. National Herbarium No. 2,040,168.

*Axonopus yutajensis* Black, sp. nov.

Perennis; culmi erecti 75-100 cm alti, glabri, viridipallidescentes, caudice ad 1.5 cm crasso; nodi 2-3; vaginae 7-35 cm longae, 1-1.5 cm latae, carinatae, ad basin subaequales, persistentes, rigidae, fortiter conduplicatae, flabelliformes; ligula 0.3-0.4 mm longa, ciliata pilis albidis ca. 0.2 mm longis; laminae 0.5-30 cm longae, 4-7 mm latae, obtusae, superiores reductae, conduplicatae, apice fissae; inflorescentiae terminales, pedunculis 1-2, 30-45 cm longis, 1-2 mm crassis; paniculae 15-22 mm longae; racemi 5-8, adscendentes vel patentes, 10-20 cm longi; rhachis 0.5 mm lata, scabrida, ad basin pedicellorum pilis longis munita, in 25 mm 10-11 spiculis praedita; spiculae 2.5-2.8 mm longae, 1-1.2 mm latae, ovatae, obtusae; gluma lemma sterileque aequalia, 5-7-nervia, nervis prominulis, glabra; flosculus spiculae longitudinem subaequans, pallidus, apice minutissime puberulo; antherae atropurpureae, 1.2-1.3 mm longae, 0.3-0.5 mm latae.

Erect robust perennial, with rigid, light green, mostly glabrous foliage; culms 75-100 cm tall, sometimes branching, the caudex attaining 1.5 cm in thickness; nodes 1-2, glabrous; sheaths 7-35 cm long, 1-1.5 cm broad, conduplicate, strongly keeled, 7 crowded at the base, flabelliform, subequal, 8-10 cm long, pale with some pink and yellow (habit of *Axonopus pruinosis* Henr.), with cataphylls intermixed at the base; ligule 0.3-0.4 mm long, ciliate, the hairs 0.2 mm long, divided from the undifferentiated base by a dark red line, with a very slight constriction at the junction of the sheath and blade, the blade very slightly broader, the collar an inconspicuous transverse line; blades 0.5-30 cm long, 4-7 mm wide (folded), the uppermost shortest, conduplicate, deciduous, obtuse or rounded, often retuse, the halves often unequal in length; peduncles 1-2, 30-45 cm long, 1-2 mm in diameter; panicles 15-22 cm long; racemes 5-8, ascending or spreading, 10-20 cm long, with a few long hairs in the axils; rachis 0.5 mm wide, green, scabrous, the pedicels subtended by numerous hairs 1-3 mm long; spikelets 10-11 per 25 mm, 2.5-2.8 mm long, 1-1.2 mm wide, ovate, obtuse, the pedicels 0.3-0.5 mm long; glume and sterile lemma equal, glabrous, with 5-7 prominent nerves; fertile floret equaling the spikelet in length, or minutely shorter, pale yellow or brown, the lemma subacute, with a minute tuft of hairs at the apex; anthers deep atropurpureous, 1.2-1.3 mm long, 0.3-0.5 mm wide.

TYPE: clumped, about 1 m high; common in thickets along fork of Caño Yutaje, alt. 1300-1400 m, Cerro Yutaje, Serranía Yutaje, Río Manapiare, Terr. Amazonas, Venezuela, February 15, 1953, *Bassett Maguire & Celia K. Maguire* 35265; U. S. National Herbarium No. 2,116,108.

*Axonopus arundinaceus* Black, sp. nov.

Perennis; culmi usque ad 3 m alti, erecti, rigidi, compressi, ad 7 mm lati, nodis paulum pilosis, internodiis 7-10 brevissimis com internodiis elongatis



alternantibus follis cinereo-viridibus; vaginae 15-20 cm longae, 1-2 cm latae, inferiores subaequales, fortiter conduplicatae, carinatae; ligula 0.1-0.2 mm longa, integra (nostra), collo saepissime pilis longis adpersis; laminae 40-60 cm longae, 8-25 mm latae (duplicatae), lineares, rigidissimae, obtusae, conduplicatae vel ad apicem planae, scabriusculae, basi ciliatae, deciduae, apice lateribus inaequalibus, uno alterove curvato vel contorto; inflorescentiae terminales, pedunculis 2, 50-100 cm longis, triquetribus, 1-1.5 mm crassis, infra panicula scabriusculis; panicula ca. 30 cm longa, axi 6 cm longo; racemi 6-12, adscendentes, 8-21 cm longi, axillis brevissime pilosis; rhachis 0.6-0.7 mm lata, viridis, scabrida, sparse pilosa, infra pedicellos paucis pilis munita, in 25 mm 8 spiculis praedita, ad basin spiculis remotis; spiculae 3.0-3.3 mm longae, 1.3 mm latae, obtusae, ovatae; gluma lemma sterile aequans, 7 nervis prominulis, inter nervos paucis pilis adpressis praedita; flosculus spiculae longitudinem aequans, pallido-albidus vel pallido-brunneus apice minutissime pilosus obtusus.

Perennial with stiff, scabrous, drab green foliage; culm up to 3 m tall (label), up to 7 mm thick at the base, compressed, the leaves arranged in fan-shaped clusters from groups of densely crowded nodes, the groups 10-15 cm apart; nodes 4-5, sparsely hairy or glabrescent; sheaths 15-20 cm long, 1-2 cm wide, conduplicate, strongly keeled, fused for more than one third to one half the width, often long hairy near the summit; ligule a thin white membrane, 0.1-0.2 mm long; collar a distinct transverse line, the interior of the collar glabrous; blades 40-60 cm by 8-25 mm (opened), conduplicate, keeled or opening above, ciliate along the lower margins, less commonly also above, sometimes scabrous, obtuse, the halves of the apex often unequal, the longer one recurved over the other to form a beak-like tip, deciduous; inflorescence terminal, scarcely to long-exserted from the sheath, the peduncles 2, about 50 cm long, triangular, 1-1.5 mm thick, minutely scabrous at the base of the panicle; panicle 30 cm long, the axis 6 cm long; racemes 6-12, ascending, the lower ones sometimes fasciculate, 8-21 cm long, the axils minutely hairy; rachis 0.6-0.7 mm wide, scabrous and sparsely short pilose along the margin, green, a few pedicels subtended by a few hairs, the lower half of the rachis often left naked by early deciduousness of the spikelets; spikelets 8 per 25 mm, the lower ones much more remote, 3.0-3.3 mm long, 1.3 mm wide, reddish, or purplish, obtuse, ovate; glume and sterile lemma equal, 7-nerved, or the sterile lemma sometimes 5-nerved, the nerves strong, with lines of short sparse hairs between the nerves; fertile floret equaling the spikelet in length, pale yellow or pale brown (somewhat lustrous in a few cases but never like the *Suffulti*), the lemma obtuse, with a few hairs at the tip.

TYPE: frequent, dominant herb of mountainside, stigmas reddish, to 3 m tall, montane savanna in caño, alt. 800 m, Cerro Moriche, Río Ventuari, Amazonas, Venezuela, January 14, 1951, *Bassett Maguire*, R. S. Cowan, & John J. Wurdack 30883; U. S. National Herbarium No. 2,040,245.

*Axonopus maguirei* Black, sp. nov. Figure 5a.

Perennis, foliis densissime pilosis; culmi 1.6 m alti, erecti, internodiis subaequalibus, ad basin 5 mm crassi, compressi; nodi 8 densissime pilosi; vaginae 3-30 cm longae, 0.7-1.0 cm latae, basales brevissimae, supremae longiores, pilosissimae, carinatae, summo linea densissime pilosa praeditae; ligula 0.4-0.5 mm longa, longe-ciliata; laminae 7-25 cm longae, 1.5-2.0 cm latae (planae), lanceolatae, acuminatae, basi supra paucis pilis 1-2 mm longis; inflorescentiae terminales, pedunculo 1 ca. 45 cm longo, 1 mm crasso, viride; panicula 23 cm longa axi 10 cm longo; racemi 12, laxae adscendentes, inferiores fascicu-

lati, 8-15 cm longi; rhachis 0.6-0.8 mm lata, viridis, scaberrima, ad basin pilis sparsis 1-2 mm longis adspersis, in 25 mm 10-11 spiculis praedita; spiculae 2.2-2.4 mm longae, 0.8 mm latae, ovatae vel oblongae, purpureae; gluma et lemma sterile aequalia, 5-7-nervia, pilorum brevium adpressorum albidorum lineis conspicuis inter nervos munita, pilis basi densioribus; pedicellus 0.3 mm longus; flosculus 2.1-2.2 mm longus, spicula paulum brevior, pallidus, sub brunneonitens, lemmate fertile apice piloso pilis brevibus.

Erect perennial with densely hairy foliage; culm 1.6 m high, 5 mm thick at the base, compressed, yellowish; nodes 8, densely long-appressed-hairy; sheaths 3-30 cm long, 0.7-1.0 cm wide, the uppermost longest, densely hairy, keeled, the collar a dense transverse line of hairs, without a wedge-shaped area; ligule 0.4-0.5 mm long, the ciliate portion longer than the base; blades 7-25 cm long, 15-20 mm wide (open), lax, lanceolate, acuminate, densely hairy on both surfaces with few to several long hairs 1-2 mm long on the upper surface at the base, glabrescent toward the apex, the margins very scabrous; inflorescence terminal; peduncles single, about 1 mm thick, 45 cm long, greenish; panicle 23 cm long, the axis 10 cm long; racemes 12, laxly ascending, the lower ones fasciculate, 8-15 cm long; rachis 0.6-0.8 mm wide, green, markedly scabrous, sometimes with a few hairs 1-2 mm long toward the base; spikelets 10-11 per 25 mm, exceeding the rachis by one quarter of their width, 2.2-2.4 mm long, 0.8 mm wide, dark purple, ovate to oblong, obtuse, the pedicels 0.3 mm long; glume and sterile lemma equal, 5-7-nerved, with characteristic, though not copious, lines of white appressed hairs between the nerves, hairiest at base; fertile floret 2.1-2.2 mm long, minutely shorter than the spikelet, pale brown, obtuse, with a tuft of hairs at the apex.

TYPE: coarse bunch grass; occasional in valley woodland south of airstrip, alt. 700 m, Serra Tepequem, Terr. do Rio Branco, Brazil, November 29, 1954, *Bassett Maguire & Celia Maguire 40108*; U. S. National Herbarium No. 2,182,169.

*Axonopus suffultiformis* Black, sp. nov. Figure 5b.

Perennis; culmi ca. 1 m alti, crassi; nodi 1-2, glabri; vaginae 8-9 cm longae, 5-7 mm latae, fortiter carinatae, conduplicatae, basi confertae, flabelliformes (*Axonopum pruinatum* simulans); ligula 0.2 mm longa; laminae 20-40 cm longae, 5-6 mm latae (duplicatae), conduplicatae, obtusae, apice nonnumquam fissae, glabrae, deciduae, pallido ovilaceae; inflorescentiae terminales 25-30 cm longae; paniculae 10-15 cm longae, axi 1-3.5 cm longo; racemi 9, subdigitati, ca. 5-13 cm longi, axillis pilis perbrevis mollibus interdum pilis longis praeditis; rachis 0.5 mm longa, viridis, dorso glabra, marginibus scabrida, pedicellorum basi pilis 0.5-0.8 mm longis praedita, in 25 mm spiculis 24-26 praedita; spiculae 2 mm longae, 0.7-0.8 mm latae, pallidae; gluma lemma sterile aequans, 5-nervis, nervis prominulis, glabra, vel basi sparse pilosa; flosculus spiculae longitudinem aequans, pallido-fulvus, glaber vel ad apicem paucissimis pilis perbrevis praeditus.

Erect perennial with pale green, rigid, mostly glabrous foliage; culm 1 m tall, 2.5-3 cm thick at the base including the leaves, little compressed; nodes 1-2, glabrous; sheaths 8-9 cm long, 5-7 mm wide, conduplicate, strongly keeled, 10-20 at the base, flabellate (like *Axonopus pruinatus* Henr.); ligule a membranous line 0.2 mm long; collar a thin transverse line; blades 20-40 cm long, 5-6 mm wide (folded), conduplicate, obtuse, often splitting at the tip, glabrous, pale olivaceous, deciduous; inflorescence terminal; peduncles 2, 25-30 cm long; panicle 10-15 cm long, the axis 1-3.5 cm long; racemes 9, subdigitate, ascend-

ing, 5-13 cm long, the axils with short and long hairs intermixed; rachis 0.5 mm wide, green, the margins scabrous; spikelets arranged neatly in close rows, 24-26 per 25 mm, sometimes more remote near the base, 2.0 mm long, 0.7-0.8 mm wide, ovate, obtuse; glume equaling the sterile lemma, sometimes minutely shorter than the floret, strongly 5-nerved, glabrous or with a few hairs at the base, pale green; pedicels 0-0.4 mm long, subtended by several hairs 0.5-0.8 mm long; fertile floret equaling the spikelet in length, acute, pale yellow, glabrous or with 1-2 minute hairs at the apex.

TYPE: locally frequent, leaves conduplicate, northwest slope, Cerro Yapacana, Río Orinoco, Amazonas, Venezuela, January 1, 1951, *Bassett Maguire, R. S. Cowan, & John J. Wurdack* 30520; U. S. National Herbarium No. 2,040,241.

This species bears a superficial resemblance to *A. suffultus* (Mik.) Par., but differs markedly from it by the presence of the midnerve and the pale florets.

*Axonopus gracilis* Black, sp. nov.

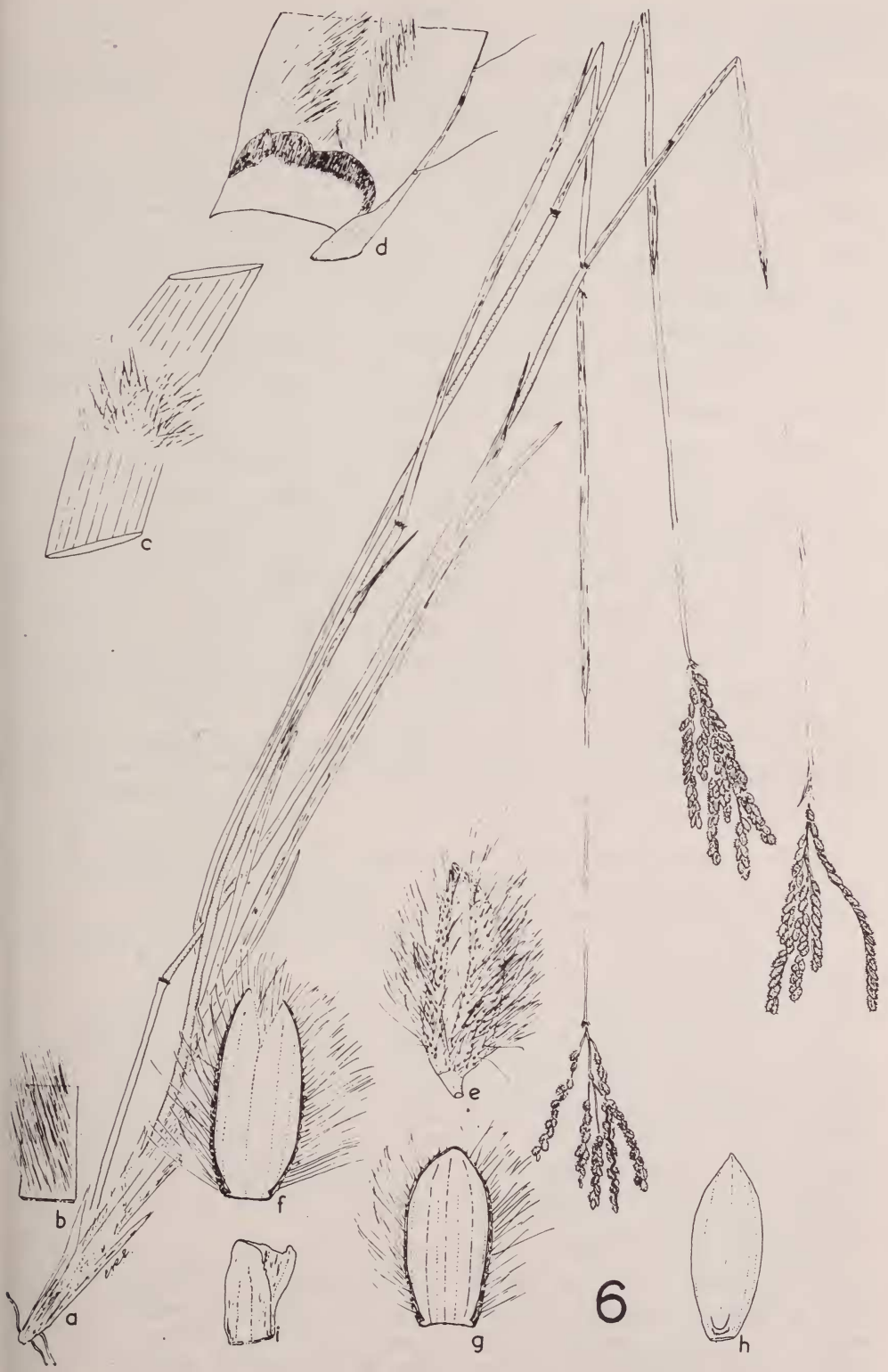
Perennis, erectus, ad basin teres; culmi 1 m alti, fortiter compressi, nonnumquam ancipitales, pallido-flavidi, glabri, nodis ca. 10, internodiis plus minusve aequalibus vel superioribus remotioribus; vaginae 10-30 cm longae, 3-5 mm latae, carinatae, superiores longiores, nonnumquam solutae, glabrae, summo latitudinem laminae aequantes; ligula 0.3-0.4 mm longa, breve ciliata; laminae 1-30 cm longae, 1-2 mm latae (duplicatae), plerumque duplicatae, adscendentes vel erectae, rigidae, obtusae, basi pilosae ciliataeque pilis ad 2 mm longis, superiores glabrescentes; inflorescentiae terminales, pedunculis crassis, ad 65 cm longis; panícula 10-15 cm longa, axi 2-4 cm longo; racemi 3-4, adscendentes, 4-12 cm longi, in axillis molliter, breviter pilosi pilis brevibus et pilis paucis longis; rachis 0.3-0.4 mm lata, flexuosa, atropurpurea vel viridescens marginibus scabrida, in 25 mm 8.5-11 spiculis praedita; spiculae 2.6-2.7 mm longae, 0.7 mm latae, pallidae, elliptico-ovatae, obtusae vel minute apiculatae; gluma lemma sterile aequans, 4-nervis, nervo mediano plerumque suppresso; pedicellus brevissimus; flosculus spiculae longitudinem aequans, pallido-brunneo-nitens, glaber, 1-2 pilis microscopicis apice praeditus.

Erect perennial, leafy throughout, the base terete; culm 1 m high, strongly flattened, 2.5-3.0 mm wide, the edges often blade-like, glabrous, pale yellow; nodes 10 or more, glabrous, the lower ones 2-3 cm apart, the upper ones more remote; sheaths 10-30 cm long, 3-5 mm wide, the upper ones longest, equaling the width of the blade or with a slight constriction at the junction with the blade, glabrous, keeled, often rose-tinted toward the summit, the margins frequently hyaline, the outer ones finally breaking up into a fibrous mass; ligule 0.3-0.4 mm long, the hairs about 0.2 mm long; blades 1-30 cm long, 1-2 mm wide (folded), mostly folded, stiff, ascending to erect, attenuate, the apex rounded, the base hairy, ciliate, the hairs up to 2 mm long; penduncles 1-2, barely exerted or long-exserted, 65 cm long, as much as 1 mm broad, sometimes compressed; panicles 10-15 cm long, the axis 2-4 cm long; racemes 3-4, ascending, 4-12 cm long, the axils with short dense hairs and a few long hairs intermixed; rachis 0.3-0.4 mm wide, dark purple or green, scabrous on the margins; spikelets 8.5-11 per 25 mm, 2.6-2.7 mm long, 0.7 mm wide, pale green, elliptic-ovate, obtuse or minutely apiculate, the pedicels 0-0.2 mm long; glume and sterile lemma equal, 4-nerved, the midnerve usually suppressed (rarely prominent), when 4, the outer

Explanation of figure 6

FIG. 6. *Paspalum canum* Sohns. *a*, plant, habit sketch; *b*, portion of basal sheath; *c*, node; *d*, ligule and upper surface of blade; *e*, spikelet; *f*, second glume; *g*, sterile lemma; *h*, fertile lemma; *i*, lodicule. *a* × 1/2; *b-b* × 8; *i* × 20. Type.





6

nerves approximate, glabrous; fertile floret equaling the spikelet in length, pale brown, shiny, glabrous or with 1-2 minute hairs at the apex.

TYPE: infrequent, southeast ridge and savanna slopes, alt. 1700 m, Cerro Sipapo (Paráque), Terr. Amazonas, Venezuela, December 20, 1948, *Bassett Maguire & Louis Politi 27818*; New York Botanical Garden.

*Paspalum canum* Sohns, sp. nov. Figure 6.

Perenne, dense caespitosum; culmi erecti, 60-75 cm alti, glabri, nodi pilosi; vaginae basi carinatae, dense adpresso-pilosae, vaginae culmorum glabrae vel prope basin interdum leviter pilosae; ligula membranacea, 0.5-0.6 mm longa; laminae 2-20 cm longae, 2-4 mm latae, supra dense adpresso-hirsutae, subtus glabrae vel leviter adpresso-hirsutae; inflorescentia 5-7.5 cm longa; racemi 5-6, axillae dense pilosae; axis racemi sinuosus; spiculae solitariae, 3-3.6 mm longae; gluma superior et lemma sterile dorso valide papilloso-pilosa; gluma superior lemma sterile subaequans, 7-nervis; lemma fertile pallidum, glabrum, 7-nerve; stamina 3; antherae 2-2.1 mm longae; lodiculae 2, 0.3-0.4 mm longae.

Perennial; caespitose, the culms erect, 60-75 cm tall, glabrous, nodes hairy; bases of old sheaths keeled, overlapping, densely appressed hairy; sheaths of culm-blades glabrous except near the base on the margins sometimes sparingly pilose; ligule a membranaceous rim 0.5-0.6 mm long; blades 2-20 cm long, 2-4 mm wide, the uppermost blades short, the upper surface with prominent nerves, densely appressed-hirsute over the midnerve and gradually less toward the margins, the margins papillose-pilose, lower surface sparingly appressed-hirsute to glabrous; inflorescence 5-7.5 cm long, with 5 to 6 racemes, densely hairy in the axils of the raceme; axis of the raceme sinuous and sharply angled; spikelets solitary, 3-3.6 mm long (average length of ten spikelets 3.3 mm); second glume and sterile lemma prominently papillose-pilose over the back, hairs up to 1.5 mm long; second glume 5-nerved; sterile lemma slightly shorter than the fertile lemma, 7-nerved; fertile lemma pale, smooth, 7-nerved; stamens 3; anthers 2.0-2.1 mm long; stigmas plumose, styles free to top of the ovary; lodicules 2, 0.3-0.4 mm long.

TYPE: frequent along stream course, east slopes of Serra Marico, alt. 1100 m, Terr. Rio Branco, Brazil, December 16-18, 1954, *Bassett Maguire & Celia K. Maguire 40349*; U. S. National Herbarium No. 2,182,187.

This species belongs to the *Lachnea* group of *Paspalum* and is related to *P. lachneum* Nees and *P. verrucosum* Hack.

*Panicum supernum* Swallen, sp. nov.

Perenne; culmi dense caespitosi, graciles, erecti, ramosi ramis appressis; vaginae internodiis multo longiores, glabrae; ligula brevissima, erosa; laminae 2-4 cm longae, involutae, erectae vel curvatae, subtus glabrae, supra pilosae, marginibus ciliatae; paniculae fragiles 2-6 cm longae, ramis filiformibus adscendentibus paucifloris; spiculae longipedicellatae, 1.4 mm longae, ellipticae, glabrae; gluma prima angusta, acuta vel subobtusa spicula 1/2 brevior; gluma secunda et lemma sterile obtusa, gluma fructu 1/4 brevior, lemma fructu longius; fructus acutus, albus, striatus.

Perennial; culms slender, densely tufted, strictly erect, branching from the middle and upper nodes, the branches closely appressed; sheaths much longer than the internodes, glabrous; ligule a very short, thin, erose membrane; blades mostly 2-4 cm long, involute, blunt, straight or curved, glabrous on the outer surface, pilose on the inner surface, ciliate, the hairs mostly enclosed; panicles fragile, exerted on very slender peduncles, 2-6 cm long, the filiform branches



ascending, few-flowered; spikelets very long-pedicellate, 1.4-1.5 mm long, elliptic, glabrous; first glume narrow, acute or subobtusate, half as long as the spikelet; second glume and sterile lemma obtuse, the glume  $\frac{3}{4}$  as long as the fruit, the lemma exceeding it; fruit acute, white, striate.

TYPE: occasional on savanna on summit of Cerro Guanay, alt. 1800 m, Amazonas, Venezuela, February 4, 1951, *Bassett Maguire, Kathleen D. Phelps, Charles B. Hitchcock & Gerald Budowski 31751*; U. S. National Herbarium No. 2,078,752.

*Panicum vigoratum* Swallen, sp. nov.

Perenne rhizomatosum; culmi robusti, erecti, 1.5 m alti; vaginae internodiis  $\frac{1}{3}$ - $\frac{1}{2}$  breviores, deciduae, glabrae, in ore pilosae; ligula 0.5-1 mm longa, ciliata; laminae 40-45 cm longae, 5-6 mm latae, attenuatae, marginibus scaberrimae; panicula 20 cm longa, 2 cm lata, ramis anguste adscendentibus, scaberulis; spiculae 2.5 mm longae, binae, appressae, glabrae; gluma prima ca. 2 mm longa, abrupte acuminata; gluma secunda et lemma sterile aequalia fructu longiora; antherae 1 mm longae.

Perennial; culms coarse, erect from strong rhizomes, about 1.5 m high; sheaths mostly half to two thirds as long as the internodes, loose, somewhat divergent or rather readily deciduous, glabrous, hairy at the throat; ligule 0.5-1 mm long, ciliate; blades firm, 40-45 cm long, 5-6 mm wide, attenuate, narrowed toward the base, the margins very scabrous; panicle (immature) 20 cm long, 2 cm wide, partly enclosed in the sheath, the slender branches rather narrowly ascending, scaberulous; spikelets 2.5 mm long, glabrous, appressed, in pairs, unequally pedicellate; first glume broad, clasping, abruptly acuminate, about 2 mm long; second glume and sterile lemma equal, pointed beyond the fruit; anthers 1 mm long.

TYPE: abundant and dominant around savanna margins, Sabana de Santo, Río Guaviarito, Cerro Guanay, Amazonas, Venezuela, January 23, 1951, *Bassett Maguire, Kathleen D. Phelps, Charles B. Hitchcock & Gerald Budowski 31601*; New York Botanical Garden.

This species is allied to *Panicum altum* Hitchc. & Chase which differs in having larger spikelets, the first glume less acuminate, and anthers 1.5 mm long.

*Panicum deciduum* Swallen, sp. nov.

Perenne; culmi erecti usque ad 4 m alti, glabri, ex nodis intermediis ramis elongatis; vaginae internodiis multo breviores, glabrae, deciduae; ligula ca. 1 mm longa, ciliata; laminae 9 cm longae, 8 mm latae, acuminatae, subtus basi pilosae, marginibus minute scabrae; ramorum laminae breviores; paniculae 3-7 cm longae, 1-3 cm latae, densae, ramis paucis adscendentibus usque ad 4 cm longis; spiculae brevipedicellatae, 3-3.2 mm longae, villosae; glumae aequales, acutae; lemma sterile acutum glumis paulo brevius; fructus stipitatus, 1.5 mm longus, acutus, albus, glabrus, lucidus.

Perennial; culms erect, apparently without rhizomes, as much as 4 m high, bearing long branches from the middle nodes, glabrous; sheaths very much shorter than the internodes, loose, readily deciduous, glabrous, ligule about 1 mm long, ciliate; blades of the midculm about 9 cm long, 8 mm wide, acuminate, pilose on the undersurface at the base, the margins minutely scabrous, the blades of the branches gradually smaller; panicles 3-7 cm long, 1-3 cm wide, rather dense, the few branches stiffly ascending, not more than 4 cm long; spikelets short-pedicellate, 3-3.2 mm long, obscured by the long silky hairs; glumes equal, acute; ster-

ile lemma similar to the glumes but a little shorter; fruit stipitate, 1.5 mm long, acute, white, smooth and shining.

TYPE: locally frequent, northwest slopes of Cerro Yapacana, alt. 800-1000 m, Río Orinoco, Amazonas, Venezuela, January 1, 1951, *Bassett Maguire, R. S. Cowan & John J. Wurdack* 30517; U. S. National Herbarium No. 2,040,239.

This unusual species probably belongs in the *Virgata* group. The tall branching culms with small hairy panicles are very different from those of any other species.

*Panicum appressifolium* Swallen, sp. nov.

Perenne; culmi erecti, ramosi, 90 cm alti, nodiis dense pubescentibus; vaginae inferiores internodia aequantes, superiores internodiis multo longiores, in collo dense pubescentes, marginibus dense ciliatae; ligula membranacea, 0.2 mm longa; laminae erectae, lanceolatae, acuminatae, 7-9 cm longae, usque ad 9 mm latae, suprema multo reducta; paniculae 9-12 cm longae, purpureae, ramis gracilibus anguste adscendentibus ramulis divergentibus flexuosis; spiculae 2.2 mm longae, glabrae; gluma prima spicula  $1/3$ - $1/2$  brevior, acuta vel subacuta, 1-nervis; gluma secunda et lemma sterile subaequalia, 7-nervia, fructu longiora; fructus 1.7 mm longus, ellipticus, acutus, striatus, minute papillosus.

Perennial; culms rather coarse, erect, about 90 cm high, the nodes densely pubescent, branching; lower sheaths about as long as the internodes, much overlapping upward, the uppermost elongate reaching or nearly reaching the base of the panicle, densely pubescent on the collar, the margins densely ciliate; ligule membranaceous, about 0.2 mm long; blades lanceolate, acuminate, erect, those of the midculm 7-9 cm long, as much as 9 mm wide, smaller upward, the uppermost greatly reduced; panicles 9-12 cm long, purple, the slender branches rather narrowly ascending, straight or flexuous, the branchlets divergent, usually flexuous; spikelets 2.2 mm long, glabrous, the pedicels of the lateral ones about as long as the spikelet; first glume  $1/2$ - $2/3$  as long as the spikelet, acute or subacute, 1-nerved or sometimes with faint lateral nerves; second glume and sterile lemma subequal, 7-nerved, pointed beyond the fruit, the lemma with a palea but without a staminate flower; fruit 1.7 mm long, elliptic, acute, striate, minutely papillose roughened, straw-colored.

TYPE: occasional in savanna, Samwarakna-tipu (Holi-tipu), alt. 1100 m, Kamarang River, Wenamu Trail, British Guiana, November 10, 1951, *Bassett Maguire & D. B. Fanshawe* 32564; U. S. National Herbarium No. 2,078,797.

Also collected on Mt. Roraima, on the great sandstone boulders, Philipp Camp, November 7, 1927, *G. H. H. Tate* 281. This specimen had been referred to *Panicum caranmense* Mez, a species allied to *P. parvifolium* Lam.

The following four species belong with the *Panicum granuliferum*—*Panicum micranthum* complex.

*Panicum subcordatum* Swallen, sp. nov.

Annum; culmi decumbentes, ramosi, usque ad 50 cm longi, glabri, internodiis aequilongis; vaginae internodiis  $1/2$  breviores, sparse pilosae vel glabrae; ligula tenuis, arcuata, 0.5 mm longa; laminae adscendentes vel appressae, 2.5-4.5 cm longae, 5-9 mm latae, acutae, subcordatae supra ad basin pilosae; paniculae usque ad 9 cm longae, ramis solitariis adscendentibus ramulis filiformibus divergentibus, in axillibus pilosis; spiculae 1.2 mm longae, glabrae, pedicellis filiformibus spiculis multo longioribus; gluma prima angusta, acuta, spicula  $1/2$  brevior; gluma secunda obtusa fructu  $1/4$ - $1/3$  brevior; lemma sterile acutum fructu longius; fructus acutus, plano-convexus, albus.

Annual; culms decumbent spreading, rooting at the nodes, rather freely branching, as much as 50 cm long, the internodes of nearly equal length, glabrous; sheaths about half as long as the internodes, sparsely pilose to glabrous; ligule thin, 0.5 mm long, high-arcuate; blades ascending or appressed, 2.5-4.5 cm long, 5-9 mm wide, acute, narrowed toward the base but rounded and clasping the culm, pilose on the upper surface near the base; panicles as much as 9 cm long, nearly as wide, the solitary branches ascending with filiform divergent branchlets, pilose in the axils; spikelets 1.2 mm long, glabrous, the filiform pedicels much longer than the spikelets; first glume narrow, acute, half as long as the spikelet; second glume obtuse,  $2/3$ - $3/4$  as long as the fruit; sterile lemma acute, exceeding the fruit, containing a staminate flower; fruit acute, plano-convex, white.

TYPE: locally abundant around Iaja at mouth of Caño Arapacua, Río Pacimoni, alt. 120 m, Amazonas, Venezuela, April 8, 1953, *Bassett Maguire & John J. Wurdack* 34917; U. S. National Herbarium No. 2,116,125.

*Panicum petrense* Swallen, sp. nov.

Annuum; culmi graciles, caespitosi, erecti, 25-30 cm alti, ramosi, ramis appressis; vaginae internodiis paulum breviores; ligula arcuata, tenuis, 0.3 mm longa; laminae 1.5-3 cm longae, 1.5-3 mm latae, vel superiores breviores, glabrae vel basi sparse pilosae; paniculae 1.5-3 cm longae, ramis gracilibus scaberulis anguste adscendentibus; spiculae 1.2-1.3 mm longae, pilosae; gluma prima acuta vel subobtusa spicula  $1/2$  brevior; gluma secunda obtusa, fructu  $1/4$ - $1/3$  brevior; lemma sterile acutum fructu longius; fructus 0.8 mm longus, ovatus, albidus, striatus.

Annual; culms slender, densely tufted, erect, 25-30 cm high, rather freely branching, the branches appressed; sheaths a little shorter than the internodes or overlapping on the branches; ligule arcuate, very thin, about 0.3 mm long; blades 1.5-3 cm long, 1.5-3 mm wide, or the uppermost smaller, bluish-green, ascending or appressed, glabrous or with a few scattered long hairs toward the base; panicles 1.5-3 cm long, the slender usually solitary branches narrowly ascending, or somewhat spreading at maturity, scaberulous; spikelets 1.2-1.3 mm long, pilose; first glume acute or subobtuse, half as long as the spikelet; second glume  $2/3$ - $3/4$  as long as the fruit; sterile lemma pointed beyond the fruit, enclosing a palea and staminate flower; fruit 0.8 mm long, ovate, white, striate.

TYPE: abundant in moist sand on exposed rocks, 15 km above San Fernando de Atabapo, Río Atabapo, Río Orinoco, Amazonas, Venezuela, October 17, 1950, *Bassett Maguire* 29259; U. S. National Herbarium No. 2,040,198.

*Panicum gracilissimum* Swallen, sp. nov.

Annuum; culmi gracilissimi, erecti vel adscendentes, simplices vel ramosi, internodiis superioribus 3.5-5 cm longis; vaginae internodiis multo breviores, glabrae; ligula arcuata, tenuis, 0.5 mm longa; laminae 7-18 mm longae, 0.5-1.3 mm latae, appressae, glabrae vel sparse pilosae; paniculae 3-5 cm longae ramis filiformibus solitariis adscendentibus in axillis pilis longis; spiculae 1-1.2 mm longae, pilosae vel papilloso-pilosae, pedicellis filiformibus 3-4 mm longis; gluma prima acuta spicula  $1/2$  brevior; gluma secunda obtusa fructu  $1/4$ - $1/3$  brevior; lemma sterile acutum, fructu longius; fructus acutus, lucidus, albus.

Annual; culms very slender, erect or ascending, 24-28 cm high, simple or branching, the upper internodes mostly 3.5-5 cm long; sheaths much shorter than the internodes, glabrous; ligule arcuate, thin, 0.5 mm long; blades 7-18 mm long, 0.5-1.3 mm wide, glabrous or sparsely pilose, usually appressed; panicles 3-5 cm long, or those of the branches smaller, the solitary, filiform branches and branch-



lets stiffly ascending, with long fine hairs in the axils; spikelets 1-1.2 mm long, pilose or papillose-pilose, the filiform pedicels mostly 3-4 mm long; first glume acute, about half as long as the spikelets; second glume obtuse,  $2/3$ - $3/4$  as long as the fruit; sterile lemma subacute, pointed beyond the fruit; fruit acute, white, shining.

TYPE: frequent in moist pockets on crystalline *laja*, 1-1.5 km east of Hotel Amazonas, Puerto Ayacucho, alt. 100-200 m, Great Rapids of the Orinoco, Terr. Amazonas, Venezuela, November 7, 1953, *Bassett Maguire, John J. Wurdack & George S. Bunting* 36043; U. S. National Herbarium No. 2,182,149.

The very slender culms with long internodes and small blades are characteristic.

*Panicum subinclusum* Swallen, sp. nov.

Perenne; culmi erecti 30-45 cm alti, pauciramosi; vaginae internodiis paulum breviores, glabrae; ligula arcuata, 0.5-1 mm longa; laminae 2.5-6.5 cm longae, 3-9 mm latae, acutae, appressae, basi sparse longe pilosae; paniculae usque ad 6 cm longae, 2 cm latae ramis gracilissimis adscendentibus; spiculae 1.1-1.2 mm longae, acutae, pilosae vel papilloso-pilosae; gluma prima acuta vel subacuta spicula ca.  $1/2$  brevior; gluma secunda obtusa fructu brevior; lemma sterile subacutum fructu longius; fructus 1 mm longus, plano-convexus, subacutus.

Perennial; culms erect, 30-45 cm high, sparingly branching, the branches apparently somewhat spreading; sheaths nearly as long as the internodes, glabrous; ligule high-arcuate 0.5-1 mm long; blades 2.5-6.5 cm long, 3-9 mm wide, acute, narrowed toward the base, bearing a few long hairs on the upper surface toward the base, appressed; panicles as much as 6 cm long, 2 cm wide, or smaller on the branches, partly enclosed in the sheath, the very slender branches ascending; spikelets 1.1-1.2 mm long, acute, pilose or papillose-pilose; first glume acute or subacute, half as long or a little more than half as long as the spikelet; second glume obtuse, shorter than the fruit; sterile lemma subacute, slightly exceeding the fruit, containing a well developed palea and staminate flower; fruit 1 mm long, strongly plano-convex, subacute.

TYPE: locally abundant, wet places on rocks, 15 km above San Fernando de Atabapo, Río Atabapo, Río Orinoco, Amazonas, Venezuela, October 17, 1950, *Bassett Maguire* 29271; U. S. National Herbarium No. 2,040,199.

The perennial habit, relatively small, partly included panicles, and large appressed blades are characteristic.

*Panicum fonticolum* Swallen, sp. nov.

Annuum? Culmi 20-35 cm longi, adscendentes, parte inferiore decumbentes vel prostrati; vaginae glabrae vel sparse pilosae internodiis multo breviores; ligula 0.4 mm longa, tenuis, truncata; laminae 2-3.5 cm longae, 2-4 mm latae, acuminatae, patentes, glabrae, tenuis; paniculae 2.5-6 cm longae, ramis solitariis adscendentibus ex basi ramosis; spiculae 1.3-1.4 mm longae, ellipticae vel obovatae, acutae, sparse pilosae; gluma prima angusta, acuta, 1-nervis, spicula  $1/3$ - $1/2$  brevior; gluma secunda et lemma sterile aequalia fructu longiora; fructus 1 mm longus, ellipticus, subobtusus, albus, striatus.

Annual? Culms 20-35 cm long, ascending, the lower part decumbent or prostrate with short internodes, leafless or the leaves soon deciduous, the upper internodes gradually longer; sheaths glabrous or very sparsely pilose, much shorter than the internodes; ligule thin, truncate, about 0.4 mm long; blades 2-3.5 cm long, 2-4 mm wide, acuminate, somewhat narrowed toward the base, thin, spreading, glabrous; panicles 2.5-6 cm long, the slender solitary branches stiffly



ascending, branching from near the base, the branchlets spreading, few-flowered; spikelets 1.3–1.4 mm long, elliptic or obovate, acute, sparsely pilose; first glume  $1/2$ – $2/3$  as long as the spikelet, narrow, 1-nerved, acute; second glume and sterile lemma equal, pointed beyond the fruit, the lemma without a palea or staminate flower; fruit 1 mm long, broadly elliptic, subobtuse, white, striate.

TYPE: on waterfall, in spray, Culebra Creek, alt. 1500–1600 m, Cerro Duida, Río Cunucunuma, Amazonas, Venezuela, November 21, 1950, *Bassett Maguire, R. S. Cowan & John J. Wurdack* 29636; U. S. National Herbarium No. 2,040,215.

Resembling *Panicum rivale* Swallen, but differing in having shorter-pedicceled, pilose spikelets, truncate rather than arcuate ligule, and acuminate blades.

The following seven species, with *P. wurdackii* and *P. steyermarkii*,\* are related to *Panicum loreum* Trin. Other species of this group previously described from the Guayana Highland are *P. eligulatum* N. E. Brown, *P. tropidoblephore* Tutin, *P. curvifolium* Swallen, and *P. tatei* Swallen. All are similar in habit, but differ markedly in specific characters. With the exception of *P. sipapoense* which has a short ligule, there is no differentiation between sheath and blade.

***Panicum vannum* Swallen, sp. nov.**

Perenne; culmi ca. 90 cm alti; foliae confertae distichae; vaginae elongatae, compressae, ecarinatae basi dense pilosae laminis deciduis; laminae 30–40 cm longae, 10–13 mm latae, acuminatae apice naviculares, marginibus scabrae, interdum sparse pilosae; panicula 14 cm longa, 5 cm lata, ramis anguste adscendentibus; spiculae 2.8–3 mm longae; gluma prima acuta spicula  $1/2$  brevior carina scabra; gluma secunda et lemma sterile aequalia fructu longiora; fructus 2.4 mm longus, ellipticus, laevis, flavidus.

Perennial; culms about 90 cm high? (base wanting); basal leaves crowded, conspicuously distichous, forming a fan-shaped cluster; sheaths elongate, flattened but not keeled, rather densely pilose at the base; ligule wanting, the demarcation between sheath and blade not evident, although the blades are apparently deciduous; blades mostly 30–40 cm long, 10–13 mm wide, narrowed toward the base, acuminate with a firm navicular tip, the margins very scabrous, otherwise glabrous or with a few scattered long hairs; panicle 14 cm long, about 5 cm wide, the branches narrowly and stiffly ascending; spikelets 2.8–3 mm long; first glume acute, about half as long as the spikelet, the midnerve scabrous; second glume and sterile lemma equal, pointed beyond the fruit; fruit 2.4 mm long, elliptic, smooth, straw-colored.

TYPE: in old fruit; locally frequent in colonies on south slope of Cumbre Camp Caño toward Caño Grande, alt. 1500–1700 m, Cerro de la Neblina, Río Yatua, Amazonas, Venezuela, January 16, 1954, *Bassett Maguire, John J. Wurdack & George S. Bunting* 37327; U. S. National Herbarium No. 2,182,161.

***Panicum sipapoense* Swallen, sp. nov.**

Perenne; culmi erecti ca. 60 cm alti; vaginae confertae ad basin dense villosae, planae; ligula 0.2–0.4 mm longa plerumque dense ciliata; laminae lineares, elongatae, usque ad 4 mm latae, ad basin attenuatae, basi longipilosae; panicula longe exserta, pyramidata, 12 cm longa, 14 cm lata ramis et ramulis patentibus; spiculae 2.7–2.8 mm longae, glabrae; gluma prima subobtusa spicula  $1/2$  brevior vel paulo longior vel brevior; gluma secunda et lemma sterile subobtusa fructum aequantia; lemma palea carinis ciliata; fructus 2.2–2.4 mm longus, laevis, flavidus.

\*Described in "Botany of the Chimantá Massif" (Mem. N. Y. Bot. Gard. 9:393–439. 1956.)

Perennial; culms erect, about 60 cm high; lower sheaths crowded, densely villous toward the base, becoming loose and flat; ligule 0.2-0.4 mm long, usually densely ciliate; blades linear, elongate, with a firm sharp tip, inrolled or flat, as much as 4 mm wide, attenuate toward the base, pilose with long hairs near the base, otherwise glabrous, even on the margins; panicle long-exserted, pyramidal, 12 cm long, about 14 cm wide, the branches and branchlets spreading; spikelets 2.7-2.8 mm long, glabrous; first glume broad, subobtuse, a little less to a little more than half the length of the spikelet; second glume and sterile lemma sub-obtuse, equalling the fruit, the lemma with a well developed palea, this ciliate on the keels; fruit 2.2-2.4 mm long, smooth, straw-colored.

TYPE: infrequent, rocks, Caño Profundo, Cerro Sipapo, Amazonas, Venezuela, January 14, 1949, *Bassett Maguire & Louis Politi* 28364; U. S. National Herbarium No. 2,040,188. Also referable to this species is *Bassett Maguire & Louis Politi* 27919, collected on banks, lower Caño Negro, 1400 m, Cerro Sipapo. The latter specimen is smaller, 40 cm high, with a smaller, scarcely exerted panicle, and the uppermost sheath is elongate with a very much reduced blade.

*Panicum cowani* Swallen, sp. nov.

Perenne; culmi erecti, robusti, 1.4 m alti, basi-adscedentes vel decumbentes; foliae basi confertae, erectae vel curvatae, laminis 50 cm longis, usque ad 13 mm latis, subtus et supra dense pilosae; culmorum foliae 2 vel 3, vaginis elongatis internodiis multo brevioribus, subglabrae, laminis multo reductis; panicula 14 cm longa ramis adscedentibus vel patentibus ramulis divergentibus implicatis; spiculae 2.6-2.8 mm longae, glabrae; gluma prima acuta spicula ca. 1/2 brevior; gluma secunda et lemma sterile acuta, subaequalia; fructus adustus, acutus, 2.2 mm longus.

Perennial; culms rather coarse, erect, 1.4 m high, apparently from an ascending or decumbent base, the upper part of the culm rather soft and spongy; leaves mostly crowded on the lower part of the culm, erect or becoming loose and curled, the blades about 50 cm long, as much as 13 mm wide, densely and rather softly hairy on both surfaces; upper culm leaves two or three, the sheaths elongate but much shorter than the internodes, glabrous or nearly so except near the base, the blades greatly reduced; panicle 14 cm long, nearly as wide, the branches ascending to spreading, the branchlets spreading, implicate; spikelets (old) 2.6-2.8 mm long, glabrous; first glume acute, about half as long as the spikelet; second glume and sterile lemma equal or nearly so, acutish; fruit brownish, acute, 2.2 mm long.

TYPE: frequent, cumbre just south of valley head of Camp Caño, sabanita and scrub forest, alt. 2000 m, Serranía Parú, Río Parú, Caño Asísa, Río Ventuari, Amazonas, Venezuela, February 2, 1951, *R. S. Cowan & John J. Wurdack* 31151; U. S. National Herbarium No. 2,040,250. Since the spikelets are old, they may have been somewhat larger than indicated in the description.

Two other specimens, without spikelets, are tentatively referred to this species: *Bassett Maguire & Louis Politi* 27681 from Lower Camp Savanna, Cerro Sipapo, Amazonas, Venezuela; and *Julian A. Steyermark* 75777 from rocky plateau below summit of Apacará-tepuí, Chimantá Massif, Bolívar, Venezuela. Additional material may prove that these are distinct species.

*Panicum inversum* Swallen, sp. nov.

Perenne; culmi erecti, 1 m alti: vaginae in parte culmorum inferiore internodiis multo longiores, vix confertae, dense villosae, infimae glabrae laminis reductis; laminae 25-35 cm longae, 9-11 mm latae, subtus et supra dense pilosae; culmorum foliae 2, vagina suprema elongata basin paniculae attingens, glabra, transverse

nervosa; panícula 14 cm longa, 3 cm lata, ramis gracilibus anguste adscendentibus vel appressis; spiculae 2.5-2.6 mm longae, pedicellis spicula multo longioribus; gluma prima spicula  $1/3-1/2$  brevior, obtusa, glabra vel carina scabra; gluma secunda et lemma sterile aequalia vel subaequalia fructum aequantia vel paulo longiora, lemma flore masculo, palea in carinis ciliata; fructus 2.3 mm longus, anguste ovatus, acutus, flavidus, laevis, lucidus.

Perennial; culms erect, 1 m high, the basal sheaths covering the lower third of the culm, well overlapping but not conspicuously crowded, densely villous, the lowermost glabrous with reduced blades; blades 25-35 cm long, 9-11 mm wide, rather densely pilose or villous on both surfaces; culm leaves 2, the upper sheath elongate, reaching the base of the panicle, glabrous, with strong transverse veins; panicle 14 cm long, about 3 cm wide, appearing rather dense, the slender branches narrowly ascending or appressed; spikelets 2.5-2.6 mm long, the pedicels usually much longer than the spikelet; first glume usually half as long as the spikelet, or rarely as much as  $2/3$  as long, obtuse, glabrous or sometimes scabrous on the midnerve; second glume and sterile lemma equal or nearly so, as long as or slightly longer than the fruit, the lemma with a well-developed palea and staminate flower, the palea ciliate on the keels; fruit 2.3 mm long, narrowly ovate, acute, yellowish, smooth and shining.

TYPE: common on summit, Cerro Guanay, alt. 1800 m, Caño Guaviarito, Río Manapiare, Río Ventuari, Amazonas, Venezuela, February 2, 1951, *Bassett Maguire, Kathleen D. Phelps, Charles B. Hitchcock & Gerald Budowski* 31722; U. S. National Herbarium No. 2,078,751.

*Panicum auyanense* Swallen, sp. nov.

Perenne; culmi erecti, 115 cm alti internodiis superioribus gracilibus elongatis; foliae basi confertae, curvatae, vaginis ad basin villosis ad summum dense villosis, laminis 25-30 cm longis, 6-9 mm latis, ad basin dense villosis, marginibus scabris; culmorum vaginae elongatae internodiis breviores laminis reductis; panícula 10-11 cm longa, 3-7 cm lata, longe exserta ramis anguste adscendentibus in parte superiore ramosis; spiculae 3.2-3.4 mm longae, glabrae; gluma prima obtusa vel subacuta, spicula ca.  $1/2$  brevior 3-nervosa; gluma secunda et lemma sterile tenuia nervis prominentibus, acuta vel subobtusa, gluma fructu paulo brevior, lemma fructum superans; fructus 2.8 mm longus, acutus, flavidus, laevis, lucidus.

Perennial; culms erect from a rhizome-like base, 115 cm high, the upper internodes slender, elongate; basal leaves crowded, becoming curled with age, the sheaths villous toward the base and densely villous toward the summit, otherwise glabrous; blades 25-30 cm long, 6-9 mm wide, densely villous on both surfaces toward the base, becoming glabrous toward the tip, the margins sometimes scabrous; culm sheaths elongate but shorter than the internodes, the blades reduced; panicle 10-11 cm long, 3-7 cm wide, long exserted, the branches stiffly and usually narrowly ascending, branching from well below the middle; spikelets 3.2-3.4 mm long, glabrous; first glume obtuse or subacute, about half as long as the spikelet, strongly 3-nerved; second glume and sterile lemma rather thin with prominent nerves, acute or subobtuse, the glume a little shorter than the fruit, the lemma somewhat exceeding it; fruit 2.8 mm long, acute, yellowish, smooth and shining.

TYPE: Auyan-tepuí, alt. 2200 m, Bolívar, Venezuela, December 1937—January 1938, *G. H. H. Tate* 1288.

This specimen was referred previously to *Panicum curvifolium* Swallen, but



in the latter species the spikelets are much smaller (2.2 mm), the panicles are larger with more spreading branches, the culms are coarser, and the blades are glabrous except just above the ligule area.

*Panicum kavanayense* Swallen, sp. nov.

Perenne; culmi erecti ca. 75 cm alti; foliae basi confertae vaginis basi dense villosis ad summum sparse vel dense pilosis, curvatis, laminis 20-25 cm longis, 4-7 mm latis, erectis, pungentibus, scaberulis, basi longe pilosis; culmorum foliae 2 laminis reductis; panicula 7 cm longa, ca. 8 cm lata, ramis adscendentibus ad basin ramosis, ramulis implicatis; spiculae 2.3-2.4 mm longae, purpureae, plus minusve confertae, pedicellis lateralibus spicula brevioribus; gluma prima lata, obtusa, marginibus hyalinis, spicula 1/2 brevior, carina scabra, nerviis lateralibus obscuris; gluma secunda obtusa fructu 1/4-1/3 brevior; lemma sterile fructum aequans, subacutum, plus minusve cucullatum; fructus 1.8 mm longus, acutus, flavidus, laevis, lucidus.

Perennial; culms erect, about 75 cm high; leaves mostly basal, becoming loose and curled with age, the sheaths densely villous at the very base, sparsely to rather densely hairy near the summit, otherwise glabrous, the blades mostly 20-25 cm long, 4-7 mm wide, erect, pungently pointed, finely scabrous, with long hairs at the base; culm leaves two with much reduced blades; panicle 7 cm long, about 8 cm broad, the branches ascending, at least some of them branching from near the base, the branchlets implicate; spikelets 2.3-2.4 mm long, purple, somewhat clustered toward the ends of the branchlets, the lateral pedicels usually shorter than the spikelet; first glume broad, obtuse, with hyaline margins, usually a little less than half as long as the spikelet, scabrous on the midnerve to nearly glabrous, the lateral nerves obscure; second glume obtuse, 2/3-3/4 as long as the fruit; sterile lemma as long as the fruit, subacute, somewhat cucullate; fruit 1.8 mm long, acute, yellowish, smooth and shining.

TYPE: frequent in savanna at Kavanayen, alt. 1200 m, Gran Sabana, Bolívar, Venezuela, March 30, 1952, *Bassett Maguire 33701*; U. S. National Herbarium No. 2,078,781.

*Panicum maguirei* Swallen, sp. nov.

Perenne; culmi erecti, 75 cm alti, foliis basi confertis; vaginae basi dense villosae, summo sparse pilosae, leviter curvatae; laminae 26-30 cm longae, 8-10 mm latae supra basi pilosae marginibus scabrae; culmorum foliae 2, vagina suprema elaminata; panicula longe exserta, 10 cm longa, ramis paucis adscendentibus vel reflexis ramulis paucis brevibus paucifloris; spiculae 2.5-2.7 mm longae, purpureae; gluma prima obtusa spicula 1/2 brevior; gluma secunda obtusa fructu brevior; lemma sterile fructum aequans vel paulo longius; fructus 2.4 mm longus, ellipticus, subacutus, laevis, lucidus.

Perennial; culms erect, 75 cm high, the leaves crowded at the base; sheaths densely villous at the very base, sparsely pilose at the summit, otherwise glabrous, becoming flat and loosely curled; blades 26-30 cm long, 8-10 mm wide, narrowed toward the base, more or less pilose above the ligule area, the margins usually scabrous; culm leaves two, the upper sheath bladeless; panicle long-exserted, 10 cm long, about as wide, the branches few, ascending to reflexed, bearing a few short branchlets above the middle; spikelets mostly 3 or 4 toward the end of the branchlets, 2.5-2.7 mm long, purple; first glume obtuse, half as long as the spikelet; second glume obtuse, shorter than the fruit; sterile lemma subacute, as long as or slightly longer than the fruit; fruit 2.4 mm long, elliptic, subacute, brownish, smooth and shining.



TYPE: bunch grass on savanna; lateral south drainage of "North Valley", alt. 1700 m, Cerro Guaiquinima, Rfo Paragua, Bolívar, Venezuela, January 2, 1952, *Bassett Maguire* 32899; New York Botanical Garden.

*Ichnanthus amplus* Swallen, sp. nov.

Perennis; culmi robusti, erecti, 2.25 m alti, foliosi nodis pilosis; vaginae internodiis longiores, glabrae, marginibus papilloso-ciliatae collo dense villosae; ligula membranacea, 0.6 mm longa; laminae usque ad 45 cm longae, 3.6 cm latae, acuminatae, ad basin angustiores, ad margines papillosae vel papilloso-pilosae, marginibus scabrae; panicula 45 cm longa, laxa, ramis verticellatis, scabris, inferioribus usque ad 30 cm longis, ramulis divergentibus; spiculae 3.6-3.8 mm longae; gluma prima spicula paulum brevior, acuta, scabra, marginibus sparse pilosa, 3-5-nervis; gluma secunda et lemma sterile aequalia, subobtusa, fructu paulum longiora, 5-7-nervia, plus minusve scabra; fructus 2.8 mm longus, subacutus, laevis, lucidus, alis 0.5 mm longis.

Perennial; culms coarse, erect, 2.25 m high, leafy, the nodes appressed-pilose; sheaths all longer than the internodes, glabrous, the margins papillose-ciliate, the collar densely villous, the mouth truncate; ligule membranaceous, 0.6 mm long with a line of hairs behind it 1-3 mm long; blades as much as 45 cm long, 3.6 cm wide, acuminate, gradually narrowed to the base but not petiolate, papillose or papillose-hairy near the margins at the base, the margins scabrous; panicle 45 cm long, rather lax, the branches in somewhat distant verticels, scabrous, the lower ones as much as 30 cm long, the branchlets spreading; spikelets 3.6-3.8 mm long; first glume nearly as long as the spikelet, acute, scabrous, occasionally with a few hairs on the margins, 3-nerved or sometimes 5-nerved; second glume and sterile lemma equal, subobtuse, slightly longer than the fruit, 5-nerved or sometimes 7-nerved, more or less scabrous; fruit 2.8 mm long, subacute, brown at maturity, smooth and shining; wings 0.5 mm long.

TYPE: locally frequent in secondary thicket by clearing, Kataima, alt. 550 m, Upper Mazaruni River, British Guiana, November 17, 1951, *Bassett Maguire & D. B. Fanshawe* 32633; New York Botanical Garden.

Related to *Ichnanthus ichnodes* (Griseb.) Hitchc. & Chase which has much smaller blades and spikelets.

*Ichnanthus tectus* Swallen, sp. nov. Figure 7.

Perennis; culmi erecti 115 cm alti; vaginae compressae, glabrae, internodiis multo longiores supra basin elongata basin paniculae attingens; laminae acuminatae ad basin longiattenuatae inferiores ca. 65 cm longae (superiores breviores), 8-10 mm latae, supra basi dense pilosae marginibus scaberrimae; panicula 25 cm longae, erectae, ramis adscendentibus vel patentibus, scaberrimis, inferioribus 7-8 cm longis; spiculae 5 mm longae, appressae, dense scabrae, pedicellis spiculis brevioribus; gluma prima 4 mm longa, obtusa; gluma secunda et lemma sterile subaequalia, obtusa, fructu longiora; fructus 4 mm longus, acutus, summo scabrus, stipitatus, alis 1.5 mm longis tenuibus plus minusve flabellatis.

Perennial; culms erect, 115 cm high; sheaths much longer than the internodes, the uppermost elongate, nearly reaching the base of the panicle, compressed, glabrous; blades acuminate, long-attenuate toward the base, the lower ones about 65 cm long, the upper ones shorter, 8-10 mm wide, strongly scabrous on the margins, densely hairy on the upper surface at the base; panicle 25 cm long, erect, the branches very scabrous, stiffly ascending or spreading, the lower ones 7-8 cm long; spikelets 5 mm long, appressed, densely scabrous, the pedicels

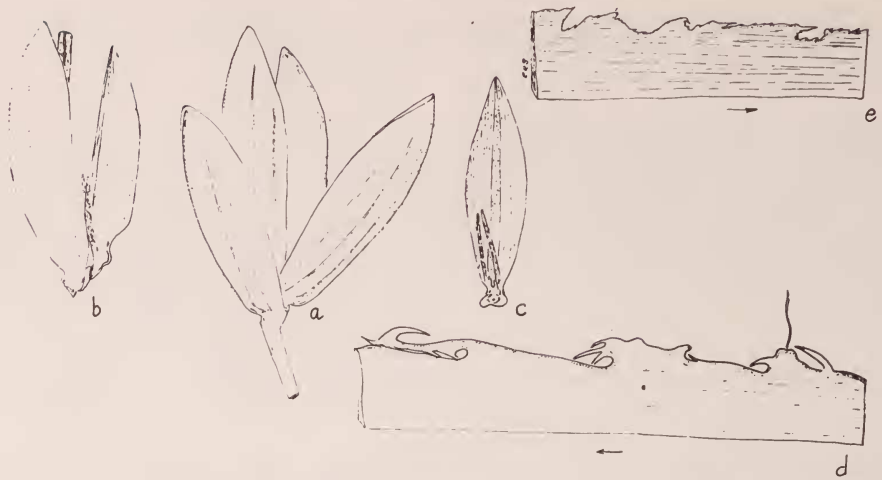


FIG. 7. *Ichnanthus tectus* Swallen. *a*, spikelet; *b*, sterile and fertile lemmas; *d*, *e*, margin of blade. *a-c*  $\times 8$ ; *d*, *e*  $\times 20$ .

shorter than the spikelets; first glume 4 mm long, obtuse; second glume and sterile lemma subequal, obtuse, exceeding the fruit, the lemma with a well developed palea; fruit 4 mm long, acute, scabrous at the summit, the base prolonged in a thickish stipe, the articulation on the ventral side; wings 1.5 mm long, thin, somewhat flabellate.

TYPE: frequent, cumbre just south of valley head of Camp Caño, sabanita and scrub forest, alt. 2000 m, Serranía Parú, Río Parú, Caño Asísa, Río Ventuari, Terr. Amazonas, Venezuela, February 2, 1951, *R. S. Cowan & John J. Wurdack* 31139; U. S. National Herbarium No. 2,040,249.

*Ichnanthus angustus* Swallen, sp. nov.

Perennis; culmi erecti 50-100 cm alti; vaginae internodiis longiores, glabrae, suprema elongata; ligula dense ciliata ca. 2 mm longa; laminae 37-50 cm longae, 9-11 mm latae, acuminatae, supra basi plus minusve pilosae, marginibus irregularis scabris; paniculae angustae, 13-20 cm longae, ramis anguste adscendentibus scaberrimis; spiculae 4 mm longae, scabrae; gluma prima 3 mm longa, obtusa; gluma secunda et lemma sterile subaequalia, obtusa, fructu paulum breviora; fructus 3.5-3.6 mm longus, acutus, stipitatus, alis tenuibus obtusis 1.3-1.6 mm longis.

Perennial; culms erect, 50-100 cm high; sheaths overlapping, glabrous, the uppermost elongate; ligule a dense rim of hairs about 2 mm long; blades 37-50 cm long, 9-11 mm wide, acuminate, narrowed toward the base but not long attenuate, more or less hairy on the upper surface at the base, the margins irregularly serrate, very scabrous; panicles narrow, 13-20 cm long, the branches very scabrous, rather narrowly ascending; spikelets 4 mm long, mostly densely scabrous; first glume 3 mm long, obtuse; second glume and sterile lemma subequal, obtuse, a little longer to slightly shorter than the fruit, the lemma enclosing a well developed palea; fruit 3.5-3.6 mm long, acute, the base prolonged in a stipe, the articulation on the ventral side; wings thin, obtuse, 1.3-1.6 mm long.

TYPE: Cumbre, alt. 1800 m, Serranía Parú, Río Ventuari, Río Parú, Caño Asísa, Terr. Amazonas, Venezuela, February 11, 1949, *Kathleen D. Phelps & Charles B. Hitchcock* 476; U. S. National Herbarium No. 2,078,745.

*Ichnanthus tectus* and *I. angustus* are related to *I. serratus* Swallen and *I. longifolius* Swallen described from Mt. Duida. These four species are similar in having blades with irregular scabrous margins and stipitate fruit, the articulation on the ventral side, the scar circular. They are differentiated as follows:

Blades 4-5 mm wide, about 30 cm long; panicles lax, the pedicels slender, usually much longer than the spikelets. *I. serratus.*

Blades 8-11 mm wide, usually more than 50 cm long; panicles stiff, the pedicels usually much shorter than the spikelets.

Blades attenuate to a fine point, smooth and shining; spikelets 3.4-3.6 mm long.

*I. longifolius.*

Blades acuminate, not shining; spikelets 4-5 mm long.

Spikelets 5 mm long; blades long-attenuate to the base; panicle branches spreading.

*I. tectus.*

Spikelets 4 mm long; blades narrowed but not long-attenuate to the base; panicle narrow, the branches ascending.

*I. angustus.*

*Lasiacis acuminata* Swallen, sp. nov.

Culmi erecti, 2 m alti, ramis gracilibus usque ad 50 cm longis; ramorum vaginæ 3-4 cm longae internodiis longiores, pilosae vel ad summum hirsutae, vel subglabrae, collo dense villosae margine ciliatae; ligula firma, 0.4-0.8 mm longa; laminae 7-12 cm longae, 5-10 mm latae, acuminae, dense pubescentes vel pilosae; paniculae 9-17 cm longae, ramis solitariis adscendentibus, scabris, paucifloris, inferioribus 6-8 cm longis; spiculae 3.6-3.8 mm longae, pedicellis 5-15 mm longis, scabris.

Culms erect, 2 m high, with slender branches as much as 50 cm long; sheaths of the branches mostly 3-4 cm long, longer than the internodes, densely pilose or hirsute toward the summit or nearly glabrous, densely villous on the collar, one of the margins ciliate; ligule firm, 0.4-0.8 mm long; blades 7-12 cm long, 5-10 mm wide, acuminate, densely pilose or pubescent on both surfaces; panicles 9-17 cm long, the solitary branches narrowly to widely ascending, few-flowered, scabrous, the lower ones 6-8 cm long; spikelets 3.6-3.8 mm long, the pedicels 5-15 mm long, rarely longer or shorter, scabrous.

TYPE: on Isla Carestia at Saltos Carestia y Gallo (5 km north of Sanariapo), alt. 100-120 m, Great Rapids of the Orinoco, Amazonas, Venezuela, November 11, 1953, Bassett Maguire, John J. Wurdack & George S. Bunting 36171; U. S. National Herbarium No. 2,182,157.

*Pariana violascens* Swallen, sp. nov.

Perennis culmis biformibus; culmi steriles 40-60 cm alti, summo 3-6 foliosi; vaginae glabrae in ore fimbriatae setis usque ad 2 cm longis; laminae 11.5-18 cm longae, 3-4 cm latae vel superiores minores, subacuminatae, ceruleo-virides, subtrus granulosae; culmus fertilis 30 cm longus, adscendens, vagina suprema elongata; inflorescentia 6 cm longa, ca. 7 mm lata, pallida, spicularum fasciculis 8-9 mm longis, pedicellis spicularum masculinarum 4 mm longis, basi dense pilosis; spiculae masculinae: glumae acutae lemmate ca. 1/2 breviores, una lata, decurrens, 2-nervis, altera angusta, enervis, vel uterque latae, tenuiter ciliatae; lemma 4.5-5 mm longum, 1.5-1.8 mm latum, acutum, granulosum, in parte superiore reticulatum.

Leafy culms 40-60 cm high with 3-6 leaves at the summit, without a smaller blade below; sheaths glabrous, the throat fimbriate, the bristles as much as 2 cm long, but usually shorter; blades 11.5-18 cm long, 3-4 cm wide, or the upper ones smaller, rather abruptly and asymmetrically subacuminate, bluish-green, granular



on the under surface; fertile culm 30 cm long, ascending; the upper sheath elongate; inflorescence 6 cm long, about 7 mm wide, pale, tinged with violet, the whorls of spikelets 8-9 mm long, the pedicels 4 mm long, not obscured by the spikelets, densely pilose at the base; staminate spikelet: glumes acute, about half as long as the lemma or somewhat shorter, one broad, decurrent, apparently 2-nerved, the other narrow, nerveless, or both glumes broad in the upper whorls, finely ciliate; lemma 4.5-5 mm long, 1.5-1.8 mm wide, acute, granular roughened, with a few transverse veins in the upper part.

TYPE: frequent, moist woodland trail, Danta Falls, Río Cuaó, Río Orinoco, Amazonas, Venezuela, November 19, 1948, *Bassett Maguire & Louis Politi 27327*; U. S. National Herbarium No. 2,040,165.

*Pariana pallida* Swallen, sp. nov.

Perennis culmis biformibus; culmus sterilis 60 cm altus, summo ca. 10-foliosus; vaginae ca. 7 cm longae, ad summum dense pubescentes, fimbriatae setis paucis brevibus; laminae inferiores 17-18 cm longae, usque ad 4.3 cm latae, superiores minores, acuminatae, petiolo crasso 3 mm longo dense pubescenti; culmus fertilis 32 cm longus vaginis inflatis tectus; inflorescentia 6 cm longa, pallida, spicularum fasciculis ca. 8 mm longis, pedicellis spicularum mascularum 2.5 mm longis, basi pubescentibus; spiculae masculae: glumae acuminatae, latae, decurrentes, 1- vel 2-nerves, vel una angusta, 1-nervis vel enervis, glabrae vel ad basin tenuiter ciliatae; lemma 4.5-5 mm longum, 2.6-3 mm latum, oblongum vel plus minusve obovatum, acutum, minute scabrum, reticulatum.

Leafy culms 60 cm high with about ten leaves in the upper third; sheaths about 7 cm long, densely pubescent toward the summit, less so or glabrous toward the base, with a glabrous glandular area just below the throat, the throat truncate with a few short fimbriate hairs; lower blades 17-18 cm long, as much as 4.3 cm wide, smaller upward, acuminate, glabrous, with a thick pubescent petiole 3 mm long; fertile culm 32 cm long, ascending, almost completely covered by the bladeless sheaths, the uppermost inflated reaching the base of the inflorescence; inflorescence 6 cm long, pale, the whorls toward the base about 8 mm long, the pedicels of the staminate spikelets about 2.5 mm long, pubescent at the base; staminate spikelet: glumes acuminate, broad, decurrent nearly to the base of the pedicels, 1- or 2-nerved, or one of them narrow, 1-nerved or nerveless, glabrous or very finely ciliate toward the base; lemma 4.5-5 mm long, 2.6-3 mm wide, oblong or slightly obovate, broadly acute, minutely scabrous, with a few transverse veins.

TYPE: common in moist lowland woods along river, Playa Alta, Río Cunucunuma, Río Orinoco, Amazonas, Venezuela, November 6, 1950, *Bassett Maguire, R. S. Cowan & John J. Wurdack 29455*; U.S. National Herbarium No. 2,040,209.

*Pariana obtusa* Swallen, sp. nov.

Perennis culmis biformibus; culmi steriles 40 cm alti, summo 3-foliosi; vaginae glabrae vel summo minute pubescentes, glandulosae in ore fimbriatae setis paucis brevibus; laminae 16-19.5 cm longae, 5.2-5.8 cm latae, acuminatae, ovatae, subtus glaucissimae, granulosa; culmus fertilis 42 cm longus, ascendens, vaginis purpureis tectus; inflorescentia 8 cm longa, pallida, exserta, spicularum fasciculis 7 mm longis, pedicellis spicularum mascularum 2 mm longis; spiculae masculae: glumae 3-4 mm longae, 1- vel interdum 2-nerves, una angusta altera latior, infra medium tenuiter ciliatae; lemma 4.5-5.0 mm longum, 2.5-3 mm latum, obtusum, scaberulum, violascens.



Leafy culms 40 cm high with three leaves at the summit and another smaller one a short distance below; sheaths glabrous or minutely pubescent at the summit with glandular spots at the throat and a very few short fimbriate bristles; blades 16-19.5 cm long, 5.2-5.8 cm wide, acuminate, ovate, very glaucous on the under surface, granular along the nerves; bladeless fertile culm 42 cm long, ascending, mostly covered by the purplish sheaths; inflorescence 8 cm long, pale, exserted, the whorls 7 mm long, the pedicels 2 mm long, rather densely pilose at the base; staminate spikelet: glumes 3-4 mm long, acute, 1- or sometimes 2-nerved, only somewhat decurrent, one narrower than the other, usually finely ciliate below the middle; lemma 4.5-5.0 mm long, 2.5-3 mm wide, obtuse, scaberulous, tinged with violet; anthers 3 mm long.

TYPE: vicinity of base camp, alt. 175 m, Cerro Sipapo (Paráque), Amazonas, Venezuela, December 25, 1948, *Bassett Maguire & Louis Politi 27940*; New York Botanical Garden.

*Andropogon indetonsus* Sohns, sp. nov. Figure 8.

Perennis; culmi erecti, 2-3 m alti, nodi glabri; vaginae glabrae, internodiis breviores; ligula 1.8-2 mm longa, membranacea; laminae 30 cm longae vel longiores, usque ad 15 mm latae, marginibus scaberrimae, omnes glabrae vel basin supra longe papilloso-pilosae; inflorescentia usque ad 30 cm longa; racemi 2-3, 2.5-8 cm longi, recti vel leviter arcuati, dense albo-pilosi; articuli 3-5 mm longi, marginibus longe pilosi, dorso tenuiter scaberrimi; spiculae sessiles 4.5-5.5 mm longae; gluma inferior spiculam aequans, 6-nervis, sulcata, marginibus versus summam scabrae; gluma superior primam aequans, carinis superne scaberrimis; lemma sterile glumam brevior, membranaceum, enerve; lemma fertile 3-3.5 mm longum, membranaceum, bifidum; arista laxa torta, 1-1.5 cm longa, scaberrima; palea lemmati subduplo brevior, membranacea, enervis; lodiculae 2, 0.5-0.8 mm longae, membranaceae; stamina 3; antherae 2-2.2 mm longae; pedicelli 3-5 mm longi, plani, marginibus pilosi, alioqui glabri vel scaberuli; spiculae pedicellatae 3.5-5 mm longae; gluma inferior 9-nervis, marginibus superne scaberrima; gluma superior primam subaequans, membranacea, carinata, 3 (-5)-nervis, marginibus superne tenuiter ciliolata; lemma sterile glumas subaequans, 3-nerve membranaceum, marginibus tenuiter ciliolatum; lemma fertile 3-3.5 mm longum, 1-nervium; lodiculae 2, 0.5 mm longae; stamina 3; antherae 2 mm longae; ovarium nullo.

Perennial, culms erect, 2-3 m tall; nodes glabrous; sheaths glabrous, shorter than the internodes; ligule 1.8-2 mm long, firm, membranaceous; blades 30 cm or more long, up to 15 mm (probably more) wide, the margins scabrous, the tip acuminate and convolute, densely long papillose-pilose at the base on the upper surface behind the ligule; inflorescence 30 cm or more long, consisting of two or three branches from each of the upper nodes, the terminal branch of each fascicle long-exserted, the spathes not inflated; other branches with inflated spathes; racemes 2-3 per peduncle, 2.5-8 cm long, mostly straight or slightly curved, densely white hairy; rachis-joints 3-5 mm long, long-pilose on the margins and occasionally on the back in definite lines, finely scaberulous over the back; spikelets paired, one sessile and one pedicellate; sessile spikelet 4.5-5.5 mm long; first glume as long as the spikelet (excluding the awn), 6-nerved, longitudinally sulcate, scabrous on the margins near the tip; second glume as long as the first, strongly keeled, scabrous on the keel toward the tip; sterile lemma about 1 mm shorter than the glumes, thin, nerveless (occasionally additional faint lateral nerves can be seen); fertile lemma 3-3.5 mm long, thin, transparent, bifid at the apex, awned from between the lobes, the lateral nerves faint

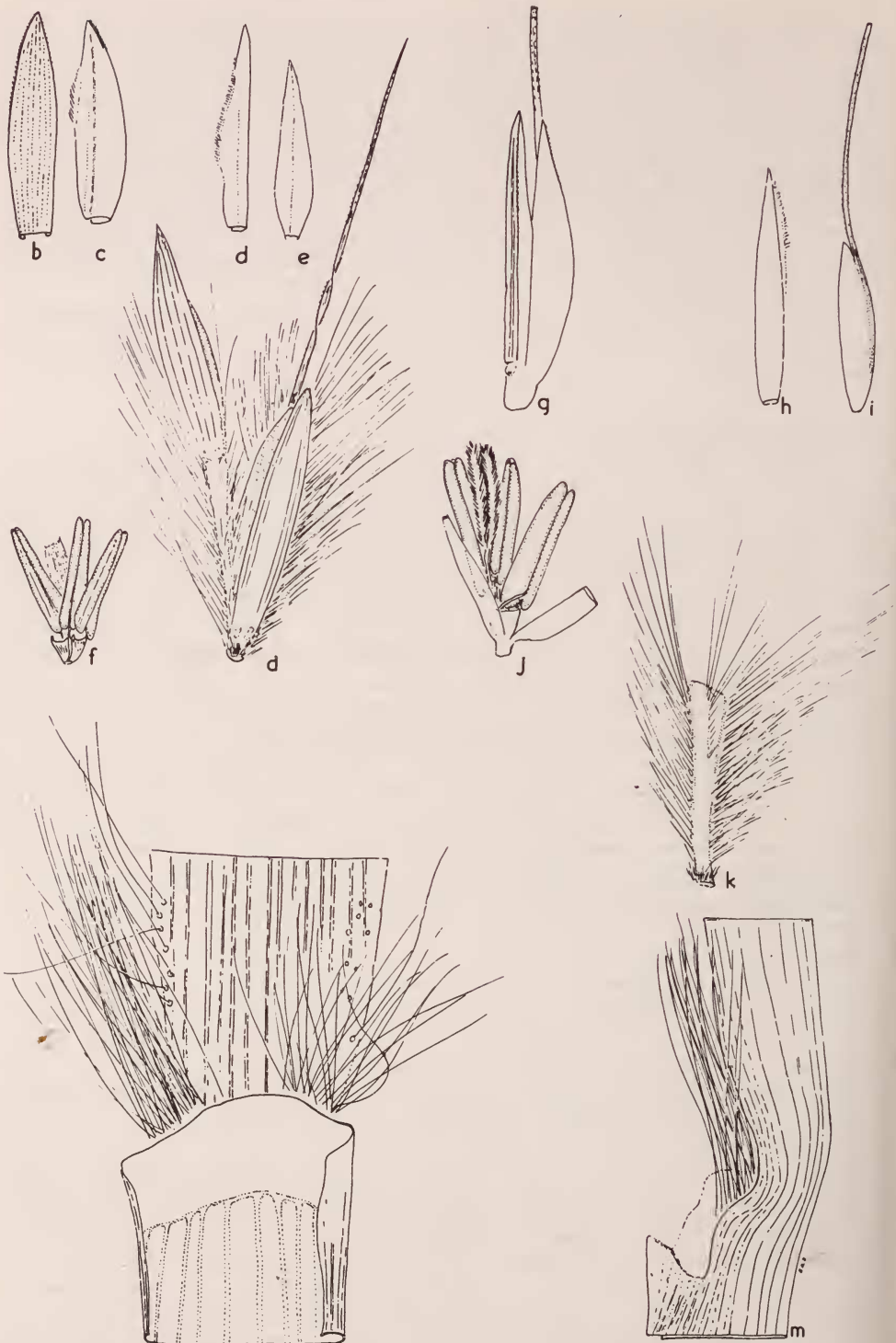


FIG. 8. *Andropogon indetonsus* Sohns. *a*, pair of spikelets; *b*, first glume; *c*, second glume; *d*, lemma of sterile floret; *e*, lemma of fertile floret; *f*, palea and essential organs (*b-f*, pedicellate spikelet); *g*, sessile spikelet; *h*, sterile lemma; *i*, palea and essential organs (*g-j*, sessile spikelet); *k*, rachis-joint; *l*, ligule, sheath, and blade; *m*, side view of ligule, sheath, and blade. All  $\times 8$ . Type.

or obsolete, the awn loosely twisted, 1-1.5 cm long, pale, antrorsely scabrous; palea about half as long as the lemma, a membranaceous, nerveless scale; lodicules 2, 0.5-0.8 mm long, thin; stamens 3, anthers 2-2.2 mm long; ovary developed; pedicel of the pedicellate spikelet 3-3.5 mm long, flattened, pilose on the margins, otherwise glabrous or scaberulous; pedicellate spikelet 3.5-5 mm long, prominent; first glume 9-nerved, the median nerve developed, scabrous on the margins toward the tip; second glume slightly shorter than the first, thin, keeled, 3 (-5)-nerved, the margins near the tip finely ciliolate; sterile lemma slightly shorter than the glumes, 3-nerved, thin, transparent, finely ciliolate on the margins; fertile lemma 3-3.5 mm long, 1-nerved; palea about three-fourths as long as the lemma, a nerveless scale; lodicules 2, 0.5 mm long; stamens 3, anthers mostly 2 mm long; ovary wanting.

TYPE: frequent in burnt-over area near east escarpment rim, Serra Tepequem, alt. 1000-1200 m, Terr. do Rio Branco, Brazil, December 4, 1954, *Bassett Maguire & Celia K. Maguire* 40148; U.S. National Herbarium No. 2,182,180.

This species superficially resembles *Andropogon lateralis* (Spr.) Nees.

*Andropogon insolitus* Sohns, sp. nov. Figure 9.

Perennis, caespitosus; culmi erecti, graciles, glabri, 25-50 cm alti; vaginae compressae, valide carinatae, glabrae; ligula brevissima, circiter 1 mm longa; laminae usque ad 25 cm longae, usque ad 2.5 mm latae, omnes glabrae, marginibus scaberrimae, prope basin supra papilloso-pilosae; inflorescentia coarctata, virgata, 5-15 cm longa; articuli marginibus pilosi, dorso pubescentes; spiculae sessiles 4-4.8 mm longae (saepe 4.2 mm longae); gluma inferior 3-nervis, carinis superne scaberrima; gluma superior 3-nervis; anthoecium inferum nullum; lemma fertile membranaceum, enerve; lodiculae 2; stamina 3; antherae 0.9-1.1 mm longae; spiculae pedicellatae 3-4.7 mm longae, staminatae vel neutrae; lodiculae 2; stamina 3; antherae 1.5 mm longae; pedicelli 1.7-2.2 mm longi, marginibus pilosi.

Perennial, tufted; culms erect, glabrous, 25-50 cm tall; sheaths mostly divergent from the culm, compressed, strongly keeled, 5 or 6 vascular bundles on each side of the keel, glabrous; ligule a membranaceous rim about 1 mm long; blades mostly basal, up to 25 cm long, to 2.5 mm wide, glabrous on both surfaces, antrorsely scabrous on the margins, strongly keeled toward the base, papillose-pilose on the margins and upper surface at the base, the midrib prominent as a line of dried gelatinous matter, especially on the upper surfaces; inflorescence compact, branches aggregated; culms supporting fascicles antrorsely short-strigose below the nodes; fascicles composed of two to several short racemes, partially enclosed in the spathes; rachis-joints short-pilose on the margins, pubescent on the back, a prominent rim of hairs below the sessile spikelet; lower pair of spikelets dissimilar, one sessile, the other pedicellate; sessile spikelet one-flowered, 4-4.8 mm long (mostly 4.2 mm long); first glume strongly flattened, margins inflexed, 3-nerved, the nerves and tip slightly scabrous; second glume keeled, 3-nerved, the laterals sometimes obscure; first floret wanting; lemma a thin, membranaceous, apparently nerveless scale enclosing the palea and essential organs; lodicules 2; stamens 3, anthers 0.9-1.1 mm long; ovary well-developed; pedicellate spikelet staminate or neuter, 3-4.7 mm long; structure similar to sessile spikelet; lodicules 2; stamens 3, anthers 1.5 mm long; ovary undeveloped; pedicel 1.7-2.2 mm long, long-pilose, especially toward the tip, the hairs about 1-1.5 mm shorter than the spikelet, a prominent rim of hairs below the sessile spikelet.

TYPE: abundant in morichal 2 km south-southwest of Ciudad Piar, alt. 300 m, Estado Bolivar, Venezuela, May 2, 1955, *Bassett Maguire & John J. Wurdack* 35777; U.S. National Herbarium No. 2,116,112.

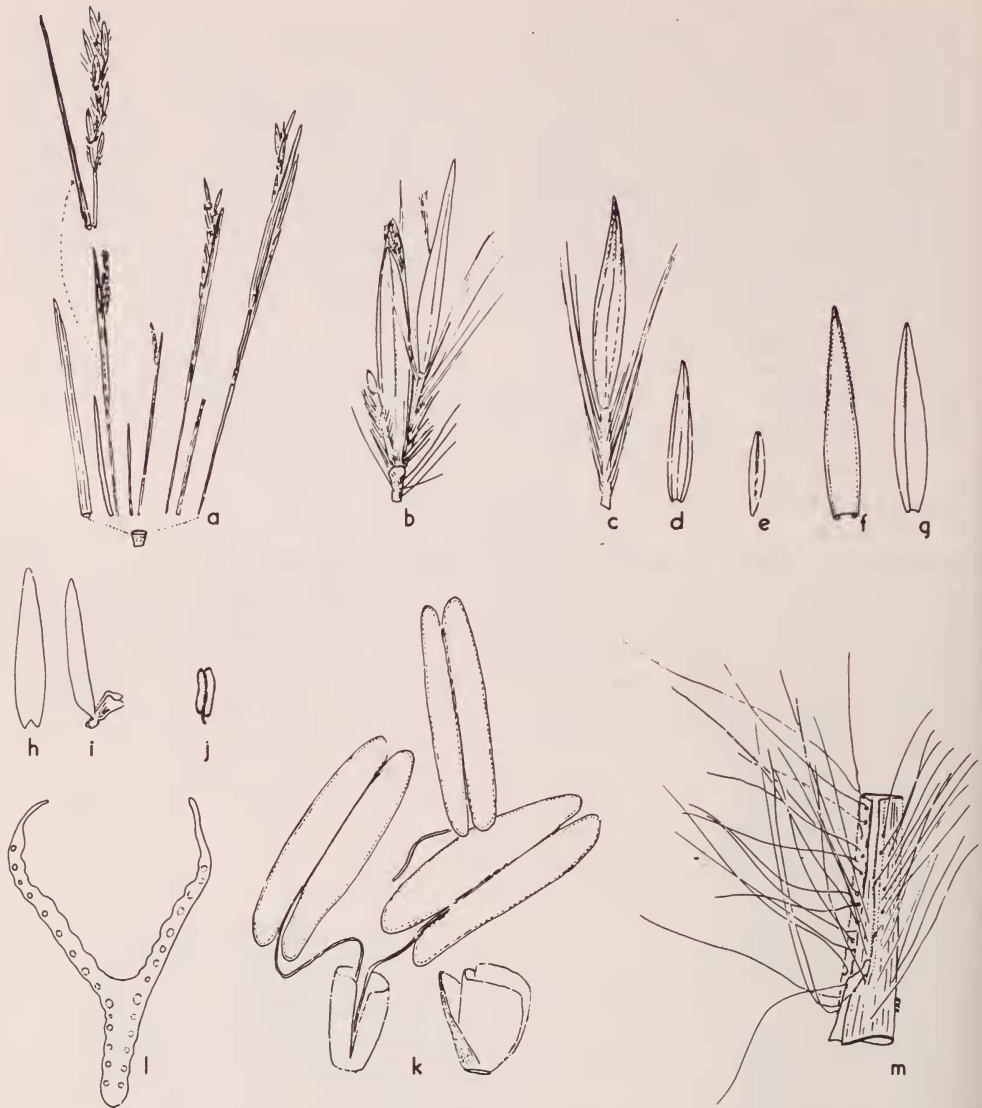


FIG. 9. *Andropogon insolitus* Sohns. *a*, cluster of branches and inflorescences,  $\times \frac{1}{2}$ ; *b*, pair of spikelets; *c*, pedicellate spikelet; *d*, second glume; *e*, lemma; *f*, first glume; *g*, second glume; *h*, fertile lemma; *i*, palea and lodicules; *j*, anther (*f-j*, sessile spikelet); *k*, stamens, palea, and lodicules of pedicellate spikelet; *l*, cross section of blade and sheath; *m*, junction of blade and sheath. *b-j*, *l-m*  $\times 8$ ; *k*  $\times 20$ . Type.

This species resembles *A. virgatus* Desv. in appearance, but has larger spikelets and the pedicels and rachis joints are pilose.

*Andropogon longiramosus* Sohns, sp. nov. Figure 10.

Perennis; culmi erecti, 2 m alti vel altiores, nodi glabri; vaginae glabrae, inferiores internodiis longiores, superiores internodiis breviores; ligula membranacea, 3-4 mm longa; laminae 65 cm longae, longiattenuatae, usque ad 1,5 cm latae, omnes scaberrimae; inflorescentia 35 cm longa; pedunculi usque ad 8 cm longi, dense albo-pilosi; articuli 4-7,5 mm longi, marginibus longe pilosi, dorso scaberrimi; spiculae sessiles 4,5-5,5 mm longae, gluma inferior spiculam aequans, 6-nervis, longitudine sulcata, marginibus scaberrimo-ciliata; gluma



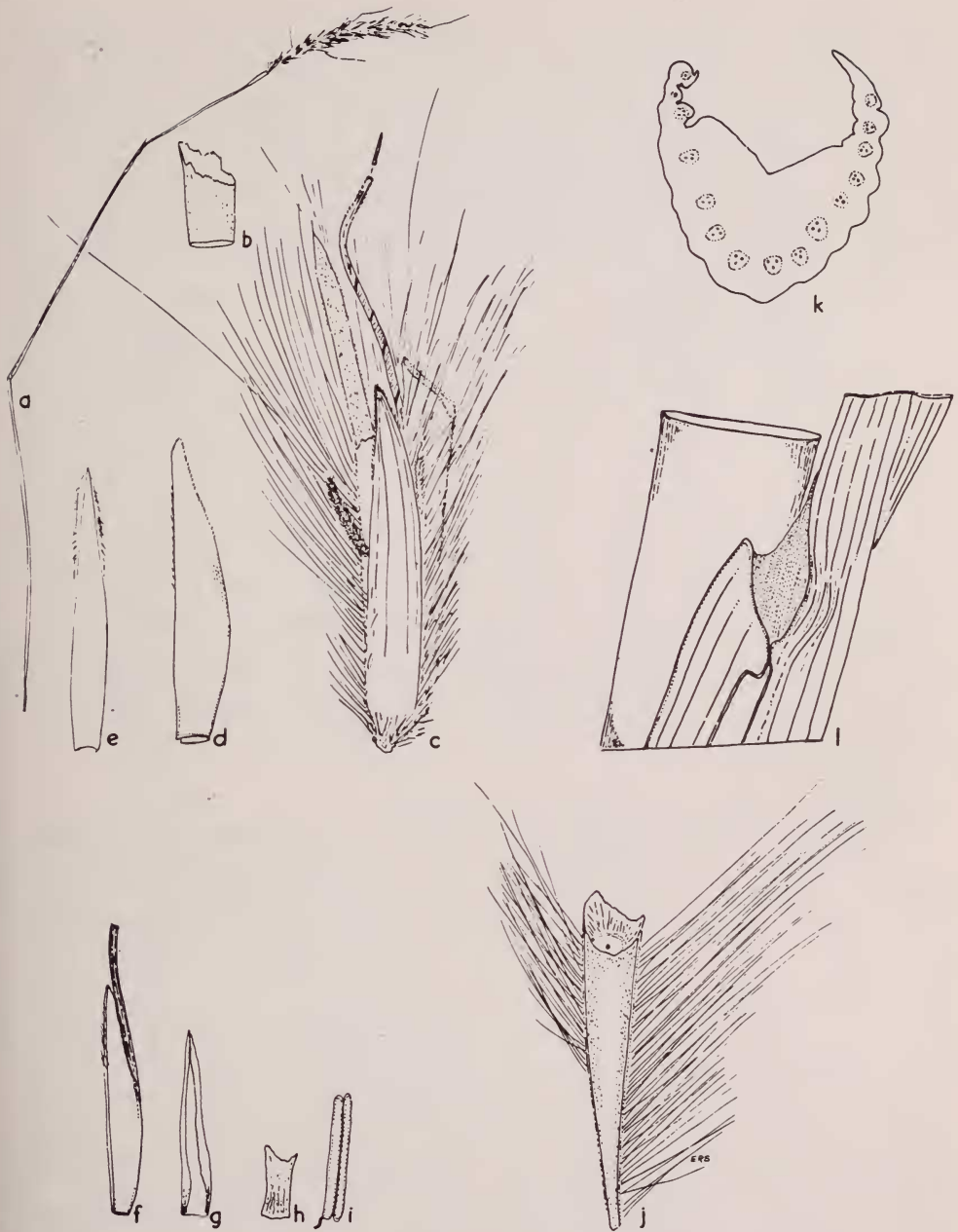


FIG. 10. *Andropogon longiramosus* Sohns. *a*, branch with terminal raceme; *b*, terminus of peduncle; *c*, pair of spikelets; *d*, second glume; *e*, sterile lemma; *f*, fertile lemma; *g*, palea; *h*, lodicule; *i*, anther; *j*, rachis-joint; *k*, cross section of blade behind the ligule; *l*, culm, ligule, junction of sheath and blade. All  $\times 8$  except *a*  $\times \frac{1}{2}$ . Type.

superior carinata, prope summam leve ciliolata, marginibus ciliolata; lemma sterile bicarinatum, glulam superiorem fere aequans; lemma fertile 3.5-4 mm longum, membranaceum, bifidum; aristae 1.5-2 cm longae, tortae; palea enervis; lodiculae 2, 0.5-0.9 mm longae; pedicelli 3.5-4 mm longi, marginibus longe pilosi; spiculae pedicellatae 2-4 mm longae, angustae; gluma inferior scaberima, arista 0.5 mm longa vel brevior; gluma superior fere obsolata.

Perennial; culms erect, to 2 m or more tall; nodes glabrous; sheaths glabrous, the lower longer than the internodes, the upper shorter, the margins prolonged as auricles at the collar; ligule membranaceous, firm, 3-4 mm long; blades up to 65 cm long, to 1.5 cm wide, scaberulous on both surfaces, the tip long-attenuate, the base narrowed and thickened; inflorescence 35 cm long, composed of numerous long, fascicled branches; peduncles 8 cm or more long, spreading, each enclosed by a sheath about two-thirds as long as peduncle; racemes solitary, 3-6 cm long, densely white hairy; rachis-joints 4-7.5 mm long, long-pilose on the margins, sometimes one side pilose on the upper half only, scaberulous over the back; spikelets paired, one sessile, the other pedicellate; sessile spikelet 4.5-5.5 mm long; first glume as long as the spikelet (excluding the awn), 6-nerved, longitudinally sulcate, the margins and tip scabrous-ciliate; second glume strongly keeled, the keel shortly ciliate toward the tip, finely ciliolate on the thin margins; sterile lemma 2-keeled, about as long as the second glume, the margins finely ciliolate toward the tip; fertile lemma 3.5-4 mm long, thin, transparent, bifid at the apex, awned from between the lobes; awns prominent, once-geniculate, twisted 3-5 times to the first bend, brown when dry, the terminal portion pale, antrorsely scabrous; palea a nerveless scale two-thirds as long as the lemma; lodicules 2, 0.5-0.9 mm long; stamens 3, anthers 2-2.5 mm long; ovary developed; pedicel of the pedicellate spikelet 3.5-4 mm long, long-pilose on the margins; sterile spikelet 2-4 mm long, narrow; first glume scaberulous, short-awned (0.5 mm or less); second glume reduced to a small scale.

TYPE: frequent in deciduous woodland between Campo Verada and Campo M. Perez, Caño Verada, Cerro Guanay, elev. 900-1100 m, Caño Guaviarito, Río Ventuari, Amazonas, Venezuela, Jan. 30, 1951, *Bassett Maguire, Kathleen D. Phelps, Charles B. Hitchcock & Gerald Budowski 31661*; U.S. National Herbarium No. 2,078,750.

*Andropogon perdignus* Sohns, sp. nov. Figure 11.

Perennis, caespitosus; culmi erecti, fere 3 m alti, glauci, nodis glabris; vaginae glabrae, internodiis breviores, interdum leviter glaucae; ligula membranacea, circiter 2 mm longa; laminae fere 45 cm longae, usque ad 15 mm latae, omnes glabrae vel supra leviter scaberrimae, subtus costa media prominula; inflorescentia 25-35 cm longa; racemi 2-4 cm longi, dense albo-pilosi; articuli ca. 3 mm longi, marginibus dense longe pilosi, dorso scaberrimi; spathae racemos aequans vel longiores; spiculae sessiles 4-5 mm longae; gluma inferior spiculam aequans, 4 (-6)-nervis, prope basin sulcata, marginibus inflexis, ciliolatis, apice scaberrima, dorso plana; gluma superior primam aequans, leviter carinata, 3-nervis, costa media breve pubescento-ciliolata; lemma sterile membranaceum, bicarinatum, marginibus ciliolatum; lemma fertile 3-3.7 mm longum, membranaceum, bifidum; arista 1.5-2 cm longa, exserta, geniculata; palea lemma fertile subaequans, membranacea, bicarinata, apice ciliolata; lodiculae 2, 0.5-0.7 mm longae; stamina 3; antherae 1.5 mm longae; pedicelli spicula sessili breviores, plani, marginibus leviter longe pilosi; spiculae pedicellatae 2.4-3 mm longae, latae; gluma prima 5-nervis (gluma secunda et lemma sterile inclusa).

Perennial; caespitose; culms erect, up to 3 m tall, glaucous; nodes glabrous; sheaths glabrous, shorter than the internodes, sometimes slightly glaucous at the base; ligule a firm membranaceous rim about 2 mm long; blades up to 45 cm long, 15 mm wide or less, glabrous on both surfaces, or slightly scaberulous on the upper surface, the midnerve prominent on the lower surface, the base of the blade narrowed and slightly thickened, the margins inrolled slightly and antrorsely scabrous; inflorescence 25-35 cm long, loosely branching; racemes 2-4 cm long, densely white-pilose and enclosed at the base by the subtending spathe; rachis-joints about 3 mm long, densely long-pilose on the margins and scaberu-

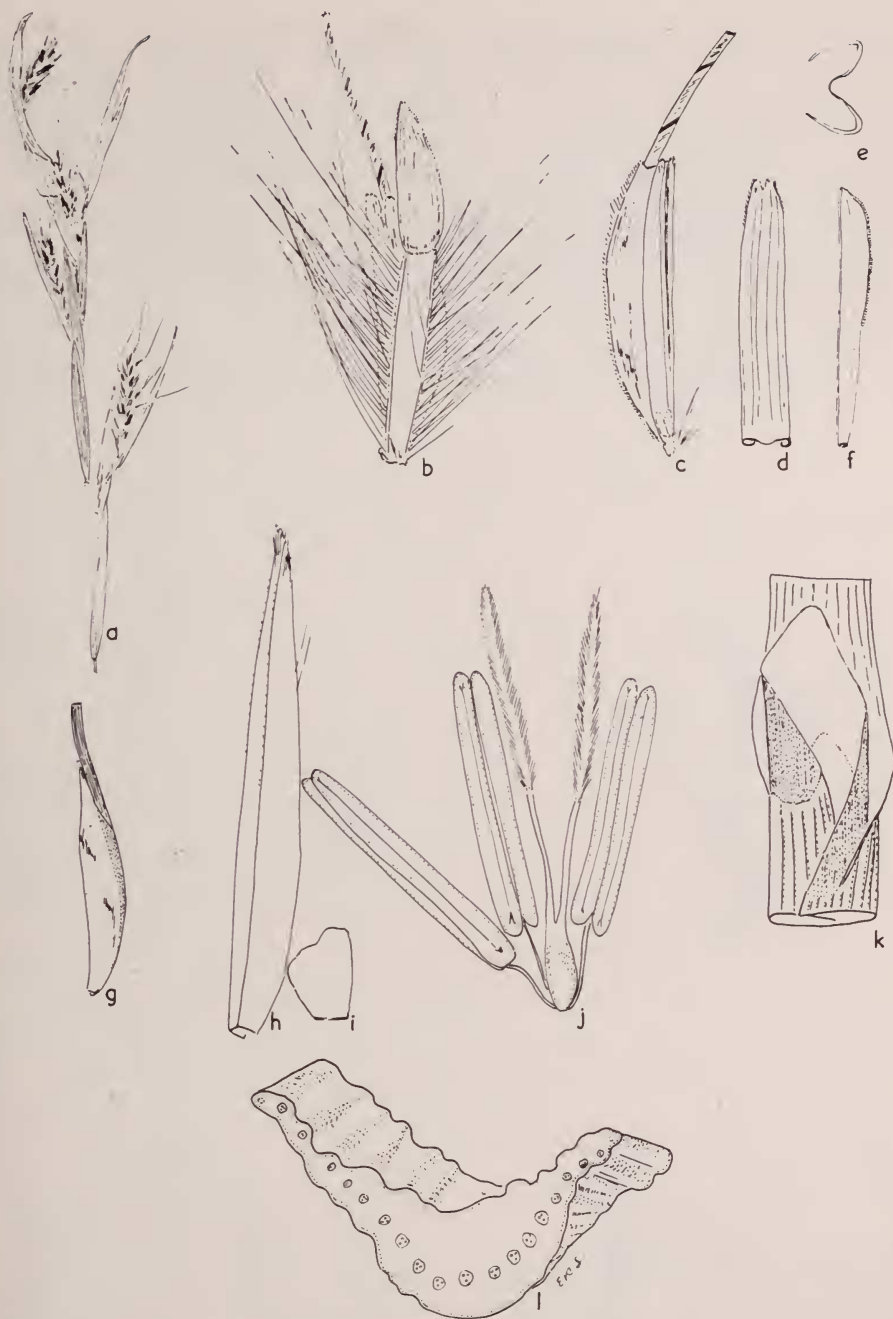


FIG. 11. *Andropogon perdignus* Sohns. *a*, branch of inflorescence,  $\times \frac{1}{2}$ ; *b*, pair of spikelets; *c*, sessile spikelet; *d*, first glume; *e*, cross section of first glume; *f*, sterile lemma; *g*, fertile lemma; *h*, palea; *i*, lodicule; *j*, essential organs; *k*, ligule, junction of sheath and blade; *l*, cross section of the blade behind the ligule. *b-g*, *k-l*  $\times 8$ ; *h-j*  $\times 20$ . Type.

lous over the back; spathes prominent, as long as or longer than the raceme; sessile spikelet 4-5 mm long (mostly 4.5 mm long), the first glume as long as the spikelet (excluding the awn), 4-(probably 6-) nerved, deeply sulcate at the base, the margins and tip scaberulous and ciliate, the back flat, the margins in-



flexed; second glume as long as the first, strongly keeled, 3-nerved, the median nerve short pubescent-ciliolate toward the tip; sterile lemma thin, 2-keeled, the margins delicately ciliolate; fertile lemma 3-3.7 mm long, thin, bifid, awned from between the lobes; awn 1.5-2 cm long, exserted, once-geniculate, the first segment brown, tightly twisted, the terminal segment pale, antrorsely scabrous; palea about 0.5 mm shorter than the lemma, thin, transparent, 2-keeled, the tip (and sometimes the margins) finely ciliolate; lodicules 2, 0.5-0.7 mm long; stamens 3, the anthers 1.5 mm or more long; ovary developed; pedicel of the pedicellate spikelet shorter than the sessile spikelet, flattened, densely long-pilose on the margins; pedicellate spikelet 2.4-3 mm long, broad; first glume (enclosing the second and sterile lemma) 5-nerved, the median nerve developed.

TYPE: bunch grass, North Escarpment, along escarpment above Culebra, alt. 1400 m, Cerro Duida, Río Cunucunuma, Amazonas, Venezuela, November 20,

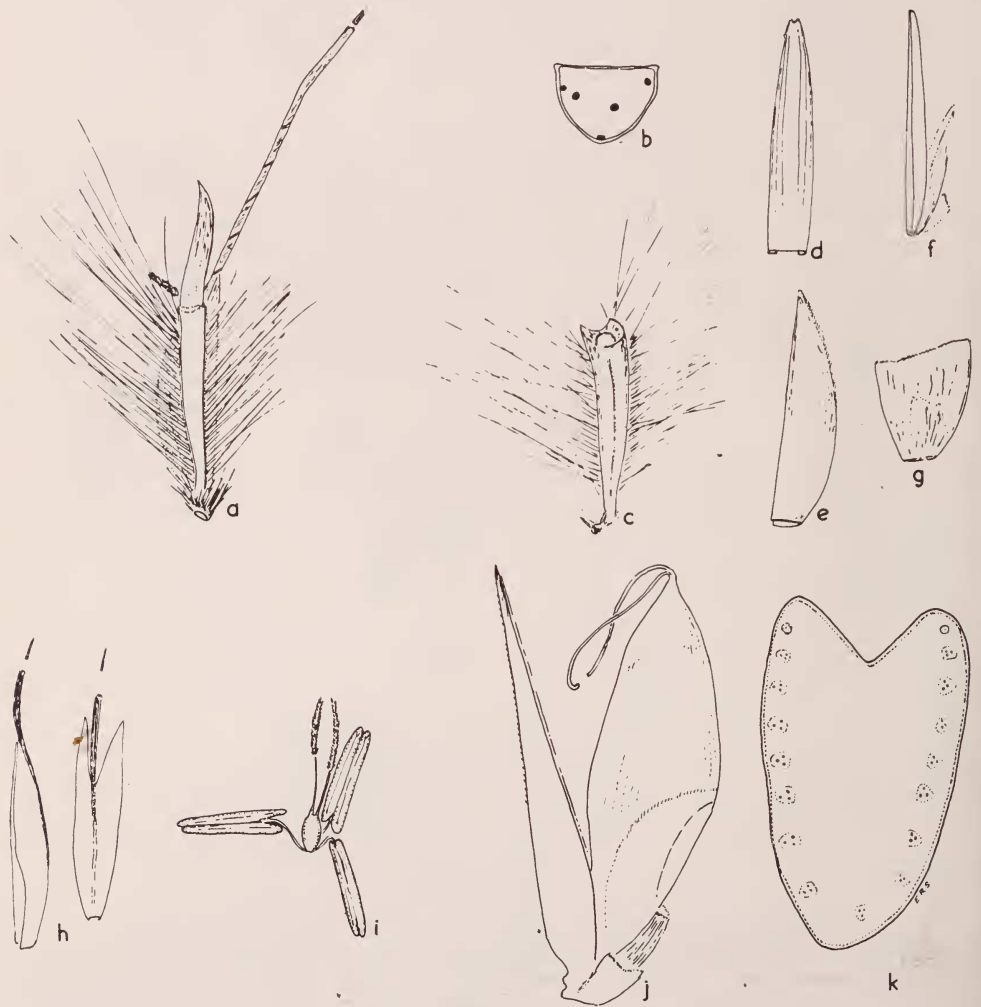


FIG. 12. *Andropogon vetus* Sohns. *a*, pair of spikelets; *b*, cross section of rachis-joint (black dots represent vascular bundles); *c*, rachis-joint; *d*, first glume; *e*, second glume; *f*, sterile lemma, palea, and lodicules of upper floret; *g*, lodicule; *h*, fertile lemma; *i*, essential organs; *j*, palea, base of lemma, lodicules, and caryopsis of upper floret; *k*, cross section of blade about 5 mm above the base. *a-i*,  $\times 8$ ; *j*  $\times 20$ . Type.

1950, *Bassett Maguire, R. S. Cowan & John J. Wurdack* 29572; U.S. National Herbarium No. 2,040,213.

*Andropogon vetus* Sohns, sp. nov. Figure 12.

Perennis; culmi erecti, 1-4 m alti, glabri vel glauci; vaginae crassae, glabrae, internodiis longiores; ligula membranacea, 3-5 mm longa; laminae 60 cm longae vel longiores, versus basin crassas, usque ad 1.5 cm latae vel latiores, omnes glabrae, attenuatae; racemi subcompositi in apice culmorum, elongati, solitarii, 1-3 cm longi; articuli 2-3.5 mm longi, marginibus longe pilosi; spiculae sessiles 3.7-5.3 mm longae; gluma inferior spiculam aequans, dorso plana, marginibus implicatis, glabra, versus summam scaberrima, 6-nervis; gluma superior primam subaequans, 1-3-nervis, carina versus summam scaberrima; lemma sterile membranaceum, vacuum; lemma fertile glumis circiter 1 mm brevior, apice bifidum; arista 1-2.5 cm longa, columna torta; palea lemmati subduplo brevior, carinis ciliolatis; lodiculae 2, 0.5-0.7 mm longae, truncatae; stamina 3; antherae 1.5-2 mm longae; pedicelli 3.5-3.8 mm longi, marginibus longe pilosi; spiculae pedicellatae 2.4-3.9 mm longae; anthoecia nulla (vel interdum cum lemmate sterili).

Perennial; culms erect, 1-4 m tall, glabrous (glaucous in the field); sheaths thick, glabrous, longer than the internodes, open; ligule a membranaceous rim 3-5 mm long, the margin of the sheath auriculate at the summit; blades long, thickened at the base, almost petiole-like, up to 60 cm long, to 1.5 cm wide, glabrous on both surfaces, the tip attenuate; inflorescence of numerous aggregate racemes; racemes solitary on each peduncle, 1-3 cm long, partially enclosed by the subtending spathe; rachis-joints 2-3.5 mm long, rounded on the back, flat on the adaxial side, long-pilose on the margins, the hairs 1-3 mm long, the apex cup-shaped, the rachis-joints hollow (vascular bundles were present in the internodes without surrounding parenchyma tissue); lowest pair of spikelets dissimilar, one sessile and one pedicellate; sessile spikelet 3.7-5.3 mm long spikelets toward the tip of the raceme longer); first glume as long as the spikelet, flat on the back, the margins inrolled, glabrous, scaberulous toward the tip, 6-(or more) nerved, the laterals faint or obsolete, scaberulous on the keel toward the tip; first floret represented by a 2-keeled, thin, membranaceous, empty lemma; fertile lemma about 1 mm shorter than the glumes, bifid at the apex, the membranaceous tips about 1 mm long, awned from between the lobes, the awn geniculate, 1-2.5 cm long, twisted 3-4 times to the first bend, brown, the tip about 1 cm long, pale, scaberulous; palea about half as long as the lemma, 2-keeled, ciliolate on the keels and at the tip; lodicules 2, truncate, 0.5-0.7 mm long; stamens 3, the anthers 1.5-2 mm long; pistil well-developed; pedicel 3.5-3.8 mm long, long-pilose on the margins; pedicellate spikelet 2.4-3.9 mm long (pedicellate spikelets longer toward the tip of the raceme), the first and second glumes developed (sometimes a sterile lemma present).

TYPE: locally frequent, northwest slopes, Cerro Yapacana, Río Orinoco, Terr. Amazonas, Venezuela, January 1, 1951, *Bassett Maguire, R. S. Cowan & John J. Wurdack* 30519; U.S. National Herbarium No. 2,040,240; 2-3 m high, frequent in thickets on left branch of Caño Yutaje, elev. 1200 m, Serrania Yutaje, Río Manapiare, February 25, 1953, *Bassett Maguire & Celia K. Maguire* 35410.

*Trachypogon ramosus* Swallen, sp. nov.

Perennis; culmi erecti robusti ca. 2 m alti, ramosi, ramis erectis nodis barbatis; vaginae, superioribus exclusis, internodiis multo longiores, glabrae, auriculatae; ligula usque ad 12 mm longa, firma, acuta vel subacuminata; laminae usque ad 27 cm longae, 5-8 mm latae, attenuatae, superiores minores reflexae; racemi 3 vel 4, adscendentes, 4-13 cm longi; spicula fertilis 8 mm longa, callo 2 mm longo dense barbato pilis ad 3 mm longis; gluma prima pilosa ad summam pilis longis; lemma sterile gluma prima brevius, tenuissimum, truncato-

erose-laceratum, marginibus ciliatis; arista ca. 2 cm longa, gracilis, obscure 2-geniculata, dense villosa; spiculae masculae 5 mm longae, conspicuosae, plus minusve purpureae, marginibus in parte superiore alis angustis hispido-ciliatis; antherae 3 mm longae.

Perennial; culms erect, rather coarse, about 2 m high, branching and rebranching, the branches erect, the visible nodes bearded with ascending hairs; sheaths, except the upper ones, much longer than the internodes, glabrous except for a few hairs at the summit, auriculate, the auricles 4-7 mm long, or shorter on the branches, acute or acuminate, coalesced with the ligule; ligule as much as 12 mm long, firm, acute or subacuminate; blades as much as 27 cm long, 5-8 mm wide, attenuate, those of the secondary branches and the upper ones smaller, the latter usually reflexed; racemes 3 or 4, ascending, 4-13 cm long, purplish; fertile spikelet 8 mm long including the callus, this 2 mm long, densely hairy, the hairs reaching to 3 mm from the tip, the scar 1 mm long, narrow, but narrowed toward both ends; first glume pilose with long hairs intermixed especially toward the summit; second glume longer than the first, sparsely covered with long hairs; sterile lemma shorter than the first glume, very thin, truncate-erose-lacerate, the margins conspicuously ciliate; awn about 2 cm long, slender, obscurely 2-geniculate, densely plumose to the tip with very fine hairs; staminate spikelets conspicuous, obscuring the fertile ones; first glume with long stiff hairs above, sparsely hairy with shorter hairs below, the margins narrowly winged in the upper half, hispid-ciliate; sterile and fertile lemmas similar, broad, thin, finely ciliate, a little shorter than the glumes; anthers 3 mm long.

TYPE: locally frequent in depression in savanna, Samwaraknatipu (Holi-tipu), alt. 1100 m, Kamarang River, Wenamu Trail, British Guiana, November 10, 1951, Bassett Maguire & D. B. Fanshawe 32547; U.S. National Herbarium No. 2,078,796.

The coarse branching culms and short awns finely plumose throughout are characteristic. In *Trachypogon plumosus* (Humb. & Bonpl.) Nees, the only other species recorded for British Guiana, the culms are more slender, only sparingly branching if at all, and the awns are mostly 5 cm long, the terminal segment scabrous only.

#### ERIOCAULACEAE<sup>6</sup>

**Carpotepala jenmani** (Gleason) Moldenke, comb. nov.

*Paepalanthus jenmani* Gleason, Bull. Torrey Club 56: 14. 1929.

**Eriocaulon brevifolium** var. **proliferum** Moldenke, var. nov.

Haec varietas a forma typica speciei capitulis folioso-proliferis recedit.

This variety differs from the typical form of the species in having its heads regularly leafy-proliferous in the center, the proliferations 1-2 cm. long.

Type: Bassett Maguire & John J. Wurdack 34595; hummocky, wet, low, open woodland Laguna at Yapacana, alt. 125 m, Alto Río Orinoco, Amazonas, Venezuela, March 20, 1953, New York Botanical Garden. The collectors note that the plant was a perennial herb, locally abundant.

**Leiothrix celiae** Moldenke, sp. nov.

Herba perennis ramosis; ramis crassis summitate foliosis; foliis herbaceis graminoides acutis longe ciliatis multistriatis; pedunculis numerosissimis filiformibus brunneis obscure 4-costatis plusminusve piloso-pubescentibus, pilis antrorsis adpressis vel leviter patentibus; vaginis plerumque arcanis glabris, ore longe piloso; capitulis obconicis griseis; bracteolis involucri brunneo-stramineis lanceolatis attenuato-acutis adpresso-pilosis; receptaculo longe piloso.

Closely-branched perennial herb; branches thick, heavy, apparently at least

<sup>6</sup>By H. N. Moldenke.



10 cm tall and to 2 cm thick, surmounted by a very dense crown of leaves; leaves herbaceous, rather bright-green on both surfaces, shiny, grass-like, 5-7 cm long, about 4 mm wide at the middle and 6 mm wide at the base, gradually tapering from the base to the acute apex, entire, long-ciliate with whitish hairs on the margins, the cilia spreading and conspicuous especially on younger leaves, otherwise glabrous on both surfaces, many-striate with parallel veins, not fenestrate; peduncles very numerous, filiform, light-brown, erect, 10-13 cm long, rather obscurely 4-costate, more or less pilose-pubescent with appressed or slightly spreading antrorse hairs; sheath about 1.5 cm long, usually hidden by the surrounding leaves, very closely appressed to the peduncle, brown, glabrous except at the long-pilose mouth, the blade very small, about 2 mm long, erect, closely appressed, acute or acuminate, long-ciliate; heads obconic, gray, about 5 mm wide, sometimes binary; involucre bractlets brownish-stramineous, herbaceous, lanceolate, about 1.5 mm long, 0.75 mm wide, attenuate-acute at the apex, appressed-pilose on the back; receptacle long-pilose; flowers sessile; receptacular bractlets oblanceolate, pale-stramineous or yellowish, navicular, concave, about 2.5 mm long, 0.5 mm wide, subacute at the apex, long-pilose at the base, barbate at the apex; staminate florets not seen; pistillate florets: sepals 3, separate, oblong-elliptic, about 1.7 mm long, 0.6 mm wide, subhyaline, obtuse or subacute at the apex, short-pilose on the back; petals 3, hyaline, oblong, about 1.2 mm long, 0.2 mm wide, subacute at the apex, long-pilose at the apex on the back; style slender, stramineous, about 1 mm long, glabrous, its 3 appendages borne about 0.5 mm from the base; stigmas 3, terminating the style.

Type: *Bassett & Celia K. Maguire 35314*; below the summit of Cerro Yutaje, alt. 2100 m, Serrania Yutaje, Río Manapiare, Amazonas, Venezuela, between February 17th and 19th, 1953, New York Botanical Garden. Several heads were dissected and no staminate florets discovered. Possibly the species is dioecious. The collectors note that it is "rare, one specimen only seen."

*Leiothrix flavescens* var. *alpina* Moldenke, var. nov.

Haec varietas a forma typica speciei recedit foliis 1.4-7 cm longis obscure puberulis vel utrinque glabris nitidisque et vaginis obscure puberulis vel glabris nitidisque.

This variety differs from the typical form of the species in having its leaves only 1.4-7 cm long, very obscurely puberulent or glabrous and shiny on both surfaces, and the sheaths very obscurely puberulent or glabrous and shiny.

TYPE: *George Henry Hamilton Tate 1109*, alt. 2200 m, Mount Auyán-tepui, Bolívar, Venezuela, New York Botanical Garden.

*Paepalanthus capillaceus* var. *spiralis* Moldenke, var. nov.

Haec varietas a forma typica speciei foliis regulariter spiraliterque undulatis recedit.

This variety differs from the typical form of the species in having all of its leaves regularly contorted in a spirally undulate or corkscrew fashion.

TYPE; *Bassett Maguire & D. B. Fanshawe 32292*, in rapidly running water of a river at 1250 m alt., Maipuri Falls, Karaurieng River, Imbaimadai Savannas on the Upper Mazaruni River, British Guiana, October 25, 1951, New York Botanical Garden. The collector notes that it is an abundant aquatic perennial at this locality and completely uniform in regard to leaf-character throughout the colony.

*Paepalanthus fulgidus* Moldenke, sp. nov.

Herba perennis; caulibus elongatis dense foliosis simplicibus erectis; foliis subcoriaceis erectis dein patentibus denique reflexis dense imbricatis subacutis utrinque parce albo-pilosis dein glabrescentibus; pedunculis stramineis 4-costatis minute pilosulis; vaginis arcte adpressis multistriatis minute albido-pilosulis,

laminis longe acuminatis, margine albo-piloso; capitulis hemisphaericis albis firmis; bracteolis involucri firmis ovatis nigris longe acuminatis adpresso-pilosis ciliolatis.

Perennial herb; stems elongate to 12 cm, densely leafy, simple, erect; leaves subcoriaceous, firm, rather uniformly bright-green on both surfaces, darker in age, at first erect, later spreading, finally reflexed, densely overlapping and completely hiding the stem, 2-4 cm long, about 5 mm wide at the middle, 7 mm wide at the base, subacute at the apex, entire, scattered-pilose on both surfaces with white hairs of various lengths, less so or glabrescent and shiny in age, longitudinally parallel-veined, the 10-12 veins subprominulous and rather conspicuous beneath and usually more or less appressed-pilose on younger leaves; peduncles 3 or 4 per plant, terminal, erect, 18-30 cm long, stramineous, 4-costate, minutely pilosulous; sheaths closely appressed, about 6 cm long, many-striate, minutely pilosulous with whitish hairs, obliquely split at the apex, the blade about 8 mm long, erect, appressed, long-acuminate, white-pilosulous on the margins; heads hemispheric, 8-9 mm wide, white, firm, blooming from the periphery toward the center; involucrel bractlets firm, stiff, ovate, black, about 2 mm long, 1.5 mm wide, long-acuminate at the apex, pilose with short appressed hairs on the back, ciliolate-margined; receptacle pilose; receptacular bractlets oblanceolate, dark-brown toward the apex, about 1.5 mm long, 0.5 mm wide, acute at the apex, densely white-barbate toward and at the apex on the back; staminate florets pedicellate; sepals 3, separate, oblanceolate, brown or blackish toward the apex, about 1.5 mm long, 0.5 mm wide, acute or short-acuminate at the apex, densely white-barbate toward and at the apex; petals 3, connate into a stramineous infundibular tube 0.5-1.5 mm long, glabrous, ampliate at the apex, the free portions very short, rounded at the apex; stamens 3, exserted; filaments white, about 0.5 mm long, glabrous; anthers brownish, oblong, about 0.35 mm long; pistillate florets not seen.

TYPE: *Bassett Maguire 33383a*, in wet areas on Mesa Ridge, alt. 5800-6000 ft., Ilu-tepuí, Gran Sabana, Venezuela, March 11, 1952, New York Botanical Garden. The species is said to be frequent at the type locality. Although many scores of florets were examined, no pistillate ones were found. It may be, therefore, that the species is dioecious. The central florets had very short corolla-tubes and the peripheral ones elongated corolla-tubes. This appears to be correlated with the degree of maturity of the anthers, so it would appear that the corolla-tube lengthens as the flowers mature. The remaining parts of the floret were uniform throughout the head.

***Paepalanthus pendulus* Moldenke, sp. nov.**

Herba perennis magna ramosa pendula; caulibus usque ad 2 m longis dense foliosis; foliis subcoriaceis arcte imbricatis lanceolatis patentibus obtusiusculis utrinque glabris nitidisque obscure multistriatis; pedunculis numerosis brunneis profunde 4-sulcatis 4-costatisque glabris; vaginis brunneis glabris nitidis adpressis, laminis lanceolatis acutis interdum parce ciliolatis; capitulis hemisphaericis griseis; bracteis involucri pallide stramineis firmis ovato-triangularibus acutis vel breviter acuminatis glabris nitidis; receptaculo piloso.

Large branched perennial herb, pendulous from cliff-faces; stems to 2 m long, densely leafy; leaves subcoriaceous, closely overlapping at the base, lanceolate, divergent-spreading, 7-9 cm long, 7-10 mm wide at the middle, about 15 mm wide at the base, rather blunt at the apex, entire, glabrous and shiny on both surfaces, obscurely many-striate; peduncles numerous, about 15 per stem, stout, brownish, 18-26 cm long, rather deeply 4-sulcate and 4-costate, glabrous; sheath brownish, 7-7.5 cm long, glabrous and shiny, rather closely appressed, the blade lanceolate, erect, appressed, 5-8 mm long, acute at the apex, sometimes slightly

ciliolate-margined; heads hemispheric, gray, 7-15 mm wide; involucre bractlets pale-stramineous, firm, ovate-triangular, about 2.7 mm long and wide, acute or short-acuminate at the apex, glabrous, shiny; receptacle pilose; receptacular bractlets linear-oblong, dark-brown or black toward the apex, very thin-textured, hyaline toward the margins, about 3 mm long, 1 mm wide, barbate near the apex on the back; staminate florets long-pedicellate: sepals 3, separate, oblanceolate, blackish toward the apex, hyaline toward the base, about 2.2 mm long, 0.7 mm wide, subacute at the apex, glabrous or with a few obscure hairs at the apex on the back; petals 3, connate into a slender stramineous tube about 1 mm long, free above, the free portions erect, 0.8-1 mm long, white-hyaline; stamens 3, exserted; pistillate florets: sepals 3, separate, light-stramineous, elliptic, about 2.5 mm long, 1 mm wide, erect, acute at the apex, long-pilose at the base, otherwise glabrous; petals 3, separate, light-stramineous, oblong, about 2.5 mm long, 0.5 mm wide, erect, acute at the apex, glabrous; style about 1.2 mm long, glabrous; stigmas 3; ovary globose, about 1 mm long and wide when mature, brownish, glabrous, 3-sulcate, 3-celled.

TYPE: *Bassett Maguire 33538a*, hanging from the wet face of cliffs at 7800 ft. alt., Ilu-tepuí, Gran Sabana, Venezuela, March 20 or 21, 1952, New York Botanical Garden.

*Paepalanthus venustus* Moldenke, sp. nov.

Herba perennis; caulibus simplicibus vel pauciramosis densissime foliosis; foliis chartaceis patentibus vel reflexis graminoides attenuatis acutis utrinque glabris; pedunculis 1-4 pallide brunneis aliquot costatis paullo contortis, in sulcis adpresso-pilosis; vaginis gracillimis arcte adpressis multistriatis glabris, laminis acutis ciliatis; capitulis hemisphaericis; bracteolis involucri ovatis nigris acutis versus apicem sparsissime ciliolatis; receptaculo longiter piloso.

Perennial simple or sparingly branched herb; stems slender, to 20 cm long, erect or ascending, very densely leafy throughout; branches to 8 cm long, densely leafy throughout, erect or ascending; leaves quite uniform throughout, chartaceous, spreading or reflexed, uniformly dark-green and shiny on both surfaces, grass-like, 1.5-2 cm long, 2-3 mm wide at the middle, gradually attenuate from the base to the apex, acute at the apex, glabrous on both surfaces, rather obscurely parallel-veined; peduncles 1-4 per plant, 10-20 cm long, erect, pale-brownish, several-costate, slightly twisted, appressed-pilose in the sulcations; sheath very slender, closely appressed to the peduncle, 3-4 cm long, many-striate, very slightly or not at all twisted, glabrous, obliquely split at the apex, the blade erect, appressed, about 3 mm long, acute at the apex, ciliate-margined; heads hemispheric, 6-9 mm wide; involucre bractlets ovate, black, about 2.7 mm long, 1.2 mm wide, acute, very sparsely ciliolate on the margins toward the apex; receptacle long-pilose; receptacular bractlets spatulate, brownish, about 2.2 mm long, 0.6 mm wide, acute, densely white-barbellate at the apex, otherwise glabrous; staminate florets: sepals 3, separate, elliptic, concave, about 2 mm long, 0.7 mm wide, acute, densely white-barbellate at the apex; petals 3, connate into a slender stramineous tube about 1.7 mm long, glabrous, the free apical portions about 0.7 mm long; stamens 3, included or equaling the petals; pistillate florets short-pedicellate: sepals 3, separate, oblanceolate, blackish toward the apex, about 2.5 mm long, 1 mm wide, white-barbate at the apex on the back; petals 3, separate, whitish or gray, oblong, about 2.5 mm long, 0.5 mm wide, densely long-pilose especially at the base, barbate at the apex; pistil brown, about 2.5 mm long, glabrous; style stout, about 1 mm long, glabrous; style-appendages 3, about 1 mm long, inserted at about the same level as and alternate with the stigmas;



stigmas 3, about 1 mm long; ovary oblong, about 0.5 mm long, glabrous, 3-sulcate, 3-celled.

Type: *Bassett Maguire* 32840, frequent in a bog under extensive "forests" of *Stegolepis* sp. in the Big Canyon drainage along the West Escarpment 1 km west of Cumbre Camp at 1800 m alt., Cerro Guaiquinima, Río Paragua, Bolívar, Venezuela, December 30, 1951, New York Botanical Garden.

***Syngonanthus cowani* var. *longipedunculatus* Moldenke, var. nov.**

Haec varietas a forma typica speciei pedunculis filiformibus 8-13 mm longis recedit.

This variety differs from the typical form of the species in having its filiform peduncles 8-13 mm long, surpassing the uppermost leaves.

TYPE: *Bassett Maguire, John J. Wurdack, & George S. Bunting* 36290, on a savanna 1 km west of Cacagual (Piedra Cacaguati), Vaupés, Colombia, on the Río Atabapo, alt. of 100 m, November 19, 1953, New York Botanical Garden. The collectors note that the plant was locally occasional and had white flowers.

***Syngonanthus pakaraimensis* Moldenke, sp. nov.**

Herba acaulescens; foliis densissime rosulatis recurvatis linearibus subacutis plusminusve dense sericeo-pilosis, ad basin densissime albido-vel cinereo-tomentosis; pedunculis plerumque 3-6 aureo-stramineis 3-costatis contortis plusminusve sericeo-pilosis, pilis patentibus saepe glanduliferis, denique glabris; vaginis gracilibus densiuscule patenti-pilosis, pilis glanduliferis, laminis lanceolatis pilosulis; capitulis hemisphaericis albis griseisque; bracteolis involucri paucis albidis griseisque obovatis rotundatis glabris; receptaculo longe piloso.

Acaulescent herb; leaves very densely rosulate, recurved, linear, 1.5-3 cm long, 1.5-2 mm wide, subacute at the apex, more or less densely silky-pilose with appressed antrorse hairs, very densely whitish- or cinereous-tomentose at the base; peduncles usually 3-6 per plant, erect, golden-stramineous, 7-27 cm long, 3-costate, twisted, more or less silky-pilose with rather spreading often gland-tipped hairs or glabrous in age; sheaths slender, 1.5-3 cm long, rather densely spreading-pilose with more or less gland-tipped hairs, obliquely split at the apex, the blade erect, appressed, lanceolate, pilosulous; heads hemispheric, white or grayish, 5-7 mm wide; involucre bractlets few, whitish or gray, thin-textured, obovate, about 1.5 mm long, 1 mm wide, rounded at the apex, glabrous; receptacle long-pilose; staminate florets pedicellate, the pedicels about 0.5 mm long, long-pilose; sepals 3, subhyaline, separate, oblanceolate, about 1.7 mm long, 0.5 mm wide, subacute, glabrous; petals 3, connate into a whitish tube about 1.7 mm long; stamens 3, included; anthers white; pistillate florets sessile: sepals 3, subhyaline, separate, lanceolate, about 2.2 mm long, 0.7 mm wide, conduplicate, long-pilose on the back with scattered hairs which easily break off; petals 3, glabrous, connate at base and apex into a hyaline tube to 2 mm long; style brownish, about 0.5 mm long, glabrous, its branches 3, about 0.5 mm long, borne at the same level as the 3 longer stigmas.

TYPE: *Bassett Maguire & D. B. Fanshawe* 32539, savanna at 1100 m alt. on the Kamarang River-Wenam Trail, Pakaraima Mountains, British Guiana, November 11, 1951, New York Botanical Garden.

***Syngonanthus phelpsae* var. *pilosus* Moldenke, var. nov.**

Haec varietas a forma typica speciei foliis dense adpresso-pilosis recedit.

This variety differs from the typical form of the species in having the leaves densely appressed-pilose with silvery hairs.

TYPE: *Bassett Maguire, John J. Wurdack, & George S. Bunting* 37308 on the west escarpment savanna 4-8 km south of Cumbre Camp, alt. of 1850-1900 m on

the summit of Cerro de la Neblina, Río Yatua, Amazonas, Venezuela, January 15, 1954, New York Botanical Garden. The collectors report that the plants were abundant, forming cushions, but had only old flowers on that date.

#### BROMELIACEAE<sup>7</sup>

The relationship of the Bromeliaceae to the area of the Guayana Highland is a curiously exact one so far as present records show. All but three genera, *Lindmania*, *Brocchinia*, and *Navia*, are very poorly represented if at all. *Lindmania* is found in southern Mexico and Central America and in the southern Andes and has a very close relative, *Cottendorfia*, in northeastern Brazil. As yet there is no authentic record of *Lindmania* from Colombia, so that its range consists of three widely separated areas with no single species occurring in more than one area.

Further the *Lindmania* species of the Guayana Highland comprise 16 of the total 29 and are readily distinguishable from the others by the combination of firm leaves and bipinnate inflorescences. Because of its consistently superior ovary and appendaged seeds *Lindmania* appears to be more primitive than *Brocchinia* and *Navia*, and I believe that it is ancestral to them.

*Brocchinia* and *Navia* are nearly perfect for a definition of the Guayana Highland area. They were both discovered in 1820 by Martius at Araracoara in southeastern Colombia, which is at one end of the area, and *Navia* extends to Tafelberg in Suriname at the eastern end. Species of one or both of them have been found at nearly every point of exploration in the area, but as yet none have been discovered outside it.

*Brocchinia* has differentiated from *Lindmania* by the development of a largely inferior ovary and increase in overall size while retaining the bicaudate seed-appendage. Some of its species show a very wide distribution within the area.

*Navia* like the dodo has lost its wings and consequently tends to have much more closely endemic species than the other two genera. Most of its species, however, have retained the superior ovary of *Lindmania*. Both *Brocchinia* and *Navia* differ from the remainder of the family in their cochlear sepals, but an occasional flower with this imbrication is found in *Lindmania*.

#### Lindmania

(Key to the species of the Guayana Highland)

1. Scape evident; axis of the inflorescence evident.
2. Flowering shoot over 13 cm long.
3. Inflorescence lax, but its branches often dense.
4. Branches of the inflorescence well developed; flowers not fasciculate.
5. Leaf-blades serrulate throughout; sepals serrulate. 1. *L. serrulata*.
5. Leaf-blades serrulate only near base or entire.
6. Pedicels 10–15 mm long, subfiliform; branches laxly many-flowered. 2. *L. wurdackii*.
6. Pedicels 2–7 mm long, stouter.
7. Branches of the inflorescence 9–25 cm long.
8. Scape-bracts exceeding all or all but the highest internodes.
9. Leaf-blades vestite on at least one side.
10. Indument on the upper side of the leaf-blade. 3. *L. paludosa*.
10. Indument on the lower side of the leaf-blade.
11. Racemes dense; leaf-blades 40 mm wide. 4. *L. cylindrostachya*.
11. Racemes lax; leaf-blades 15 mm wide. 5. *L. argentea*.

<sup>7</sup>By Lyman B. Smith. Illustrated by Robert J. Downs.

9. Leaf-blades completely glabrous. 6. *L. phelpsiae*.  
 8. Scape-bracts much shorter than all but the lowest internodes.  
 12. Leaf-blades serrulate toward the base; axis 5 mm in diameter; racemes dense. 7. *L. geniculata*.  
 12. Leaf-blades entire; axis 2.5 mm in diameter; racemes lax. *L. guianensis*.  
 7. Branches of the inflorescence not more than 7 cm long.  
 13. Leaf-blades linear-lanceolate with slightly convex sides, 33 mm wide. 8. *L. brachyphylla*.  
 13. Leaf-blades narrowly triangular with straight sides, 15 mm wide.  
 14. Primary bracts linear, short; leaves secund. 9. *L. steyermarkii*.  
 14. Primary bracts broadly triangular, large; leaves not secund. 10. *L. tillandsioides*.  
 4. Branches of the inflorescence reduced to pulvini; flowers fasciculate. 11. *L. subsimplex*.  
 3. Inflorescence densely cylindric.  
 15. Leaf-blades serrate near base, 20 mm wide; scape elongate. 12. *L. thyrsoides*.  
 15. Leaf-blades entire, 10 mm wide; scape 6 cm long. 13. *L. stenophylla*.  
 2. Flowering shoot not more than 13 cm. long; leaves densely white-flocculose beneath; flowers erect-secund. 14. *L. minor*.  
 1. Scape none; inflorescence corymbose, few-flowered; leaves much shorter than the normally elongate stem. 15. *L. navioides*.  
 2. *Lindmania wurdackii* L. B. Smith, sp. nov. Fig. 13.

Caulescens, florifera 55 cm alta; foliis ad 45 cm longis, vaginis ellipticis, parvis, vix distinctis, laxe serratis et minutissime lepidotis, laminis linearibus, acuminatis, 14 mm latis, planis, basibus extremis exceptis glabris integrisque; scapo erecto vel adscendente, gracili, glabro; scapi bracteis strictis, subfoliaceis, magnis et internodia multo superantibus sed scapum paulo occultantibus, integris; inflorescentia laxe bipinnatim paniculata, anguste pyramidata, 36 cm longa, 17 cm lata, glabra; bracteis primariis angustissime triangularibus; ramis patentibus, sublaxe quaquaverseque multifloris, basibus sterilibus brevibus nudisque, bracteis florigeris ellipticis, vix 2 mm longis, membranaceis; pedicellis divergentibus, gracillimis, 10-15 mm longis; sepalis late ellipticis, obtusis, 3 mm longis, integris; petalis late ellipticis, obtusis, 7 mm longis, albis, stamina paulo superantibus; ovario pyramidalis; stylo brevi; seminibus longe caudatis.

TYPE: infrequent on wet rocks, about base of falls, upper Caño Culebra at 1300 m alt., Cerro Duida, Río Cunucunuma, Amazonas, Venezuela, November 20, 1950, B. Maguire, R. S. Cowan & J. J. Wurdack 29637.

VENEZUELA: Bolívar: Chimantá Massif; terrestrial on rock ledge by river at 1895-1910 m alt., occasional, summit, along Caño Mojado, between base of upper falls and drop to escarpment, Torono-tepuí, February 23, 1955, J. A. Steyermark & J. J. Wurdack 1098. *Bonnetia* forest, northwestern part of summit of Abácapa-tepuí at 2125-2300 m alt., April 13, 1953, J. A. Steyermark 74931. (Larger and stouter than the type. Material very old and weathered.)

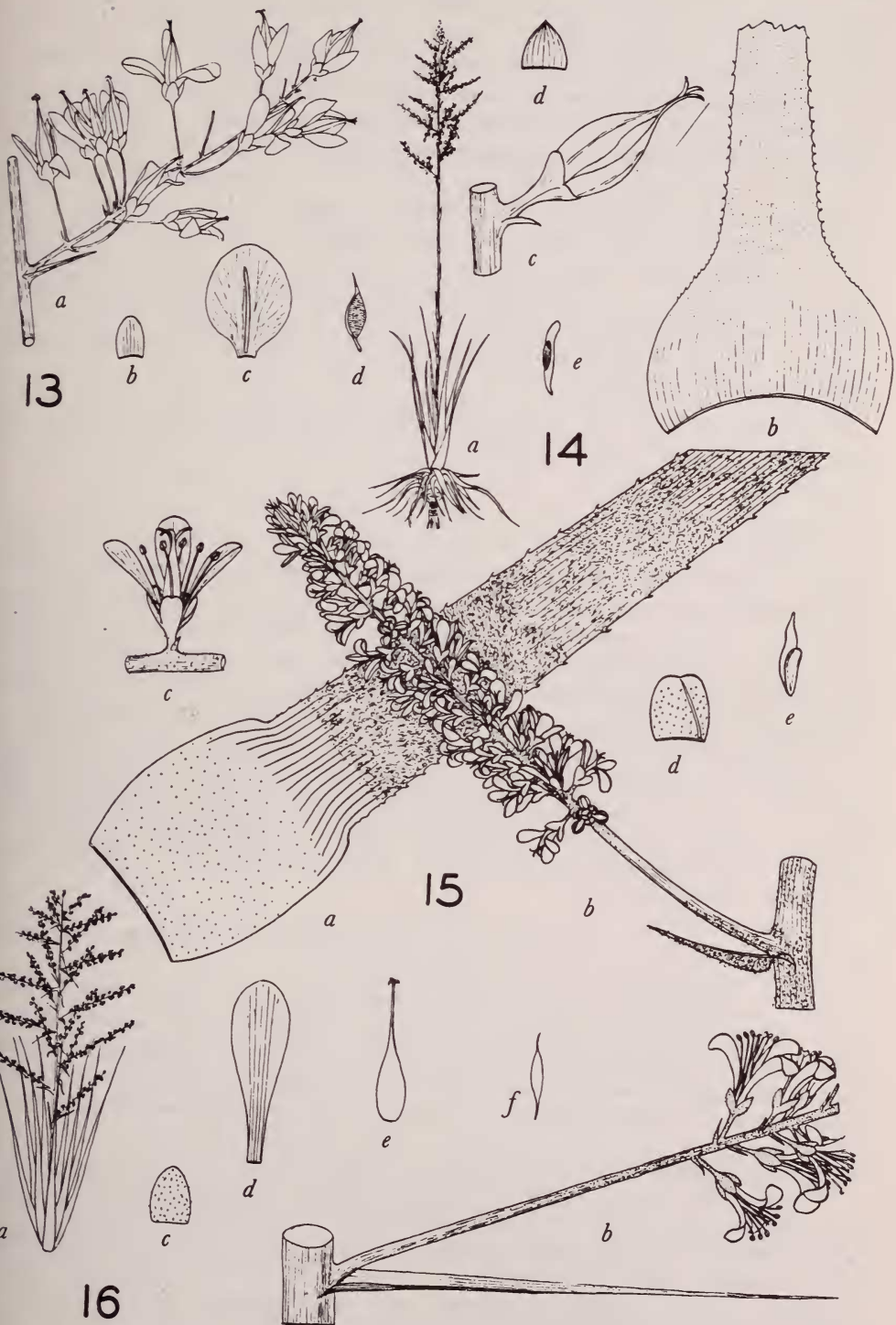
### 3. *Lindmania paludosa* L. B. Smith, sp. nov. Fig. 14.

E. planta vetusta imperfecte cognita, florifera metralis vel ultra; caudice plantae sterilis 1-3 dm longo; foliis multis, bulboso-rosulatis, ca. 45 cm longis; vaginis suborbicularibus, 7 cm latis, basi integerrimis, stramineis, glabris, apice

#### Explanation of figures 13-16

FIGS. 13-16. *Lindmania*. Fig. 13. *L. wurdackii* (Maguire, Cowan & Wurdack 29637). a, branch of inflorescence,  $\times 1$ ; b, sepal,  $\times 2$ ; c, petal and filament,  $\times 2$ ; d, seed,  $\times 5$ . FIG. 14. *L. paludosa* (Maguire 33034). a, habit,  $\times \frac{1}{20}$ ; b, base of leaf,  $\times \frac{1}{2}$ ; c, fruit,  $\times 2$ ; d, sepal,  $\times 2$ ; e, seed,  $\times 2$ . FIG. 15. *L. cylindrostachya* (Maguire 35280). a, base of leaf,  $\times \frac{1}{2}$ ; b, branch of inflorescence,  $\times \frac{1}{2}$ ; c, flower,  $\times 1$ ; d, sepal,  $\times 2$ ; e, seed,  $\times 4$ . FIG. 16. *L. phelpsiae* (Phelps & Hitchcock 501). a, habit,  $\times 1/20$ ; b, base of branch,  $\times 1$ ; c, sepal,  $\times 2$ ; d, petal,  $\times 2$ ; e, pistil,  $\times 2$ ; f, seed,  $\times 5$ .





dense serrulatis, brunneis et supra dense lepidotis; láminis anguste triangularibus sed apice ipse obtusis incrassatisque, 28 mm latis, supra lepidibus pallidis filamentoso-partitis dense lanatis, subtus glabris, basi spinis latis brunneis rectis vel hamatis 1 mm longis subdense serratis; scapo erecto, quam foliis subduplo longiore, ex sicco 8 mm diametro, glabro; scapi bracteis subfoliaceis sed integerrimis, erectis, supremis exceptis internodia superantibus sed angustis et scapum nullo modo obtegentibus; inflorescentia ample subtripinnatim paniculata, pyramidata, 4 dm longa, 2 dm diametro, glabro; axi fere recto; bracteis primariis eis scapi similibus sed gradatim minoribus, quam basibus sterilibus nudis ramorum duplo vel triplo brevioribus; ramis simplicibus vel paulo divisis, subdense quaquaverseque florigeris; bracteis florigeris late ovatis, pedicellos robustos 2-3 mm longos subaequantibus; floribus patentibus; sepalis late ovatis, 3.5 mm longis, integris, paucinervatis; petalis staminibusque ignotis; stylo gracili; ovario minutissime infero, placentis interno loculorum angulo lineatim affixis; seminibus caudatis.

TYPE: marsh-bog on rocky elevations in savanna near cumbre camp, 1800 m alt., Cerro Guaiquinima, Río Paragua, Bolívar, Venezuela, January 9, 1952, B. Maguire 33034.

4. *Lindmania cylindrostachya* L. B. Smith, sp. nov. Fig. 15.

Florigera 1 m alta; foliis 7 dm longis, vaginis late ellipticis, 6 cm longis, integris, impresso-punctatis, ex sicco stramineis, glabris, laminis angustissime triangularibus, 4 cm latis, coriaceis, supra glabris, subtus dense albo-flocculosis, ad basin versus laxe serrulatis; scapo recto, 15 mm diametro, albo-flocculoso; scapi bracteis subfoliaceis, erectis, dense imbricatis, integris; inflorescentia laxe bipinnatim paniculata pallide brunneo-flocculosa; axi recto; bracteis primariis anguste triangularibus, quam ramorum basibus sterilibus nudis applanatis ad 8 cm longis subduplo brevioribus; ramis patentibus, leviter sursum curvatis, 21 cm longis, dense florigeris; bracteis florigeris triangularibus, quam pedicellis graciliter obconicis 5 mm longis subduplo brevioribus; floribus patentibus, nullo modo secundis; sepalis late ellipticis, retusis, 5 mm longis, verruculosis, integris; petalis obtusis, 12 mm longis, stamina superantibus, pallide roseis; seminibus longe caudatis.

TYPE: terrestrial, frequent in thickets on rocky summit at 1600 m alt., main branch of Caño Yutaje, Serranía Yutaje, Río Manapiare, Amazonas, Venezuela, February 17-19, 1953, B. & C. K. Maguire 35280.

The combination of serrate leaves with flocculose under surface, laxly bipinnate inflorescence, straight axis, dense racemes, and non-secund flowers distinguishes *Lindmania cylindrostachya* within the genus. However, its coarse habit and roseate petals reduce some of the previous distinctions between *Lindmania* and *Connellia*, making the position of the latter precarious.

6. *Lindmania phelpsiae* L. B. Smith, sp. nov. Fig. 16.

Verisimiliter acaulis, florifera metralis; foliis 6 dm longis, vaginis ellipticis, 4 cm longis, albo-cretaceis, laminis angustissime triangularibus, longe acuminatis, 2 cm latis, glabris, basi extrema laxe minuteque serrata excepta integris; scapo erecto, quam foliis brevior; scapi bracteis subfoliaceis sed omnino integris, erectis, magnis, internodia multo superantibus; inflorescentia laxe ampleque bipinnatim paniculata, 6 dm longa, lepidibus minutissimis glanduliformibus ferrugineis subdense obtecta; axi leviter flexuoso; bracteis primariis angustissime triangularibus, quam ramis multo brevioribus; ramis patentibus, a

25 cm longis, gracilibus, subdense quaquaverseque florigeris; bracteis florigeris linearibus, obtusis, pedicellos subaequantibus vel paulo superantibus, tenuibus, rubris; pedicellis patentibus, gracilibus, 3.5 mm longis; sepalis late ellipticis, obtusis, 4 mm longis, integris, tenuibus, rubescentibus; petalis spathulatis, obtusis, 12 mm longis, albis; staminibus verisimiliter petala subaequantibus sed antheris ignotis, filamentis serie secundae cum petalis breviter connatis; ovario fusiformi, stylo gracili, placentis interno loculorum angulo lineatim affixis; seminibus caudatis.

TYPE: cumbre at 2000 m alt., Cerro Parú, Río Parú, Caño Asisa, Amazonas, Venezuela, February 11, 1949, K. D. Phelps & C. B. Hitchcock 501.

12. *Lindmania thyrsoides* L. B. Smith, sp. nov. Fig. 17.

Florifera 5-10 dm alta; foliis ad 32 cm longis, vaginis imperfecte cognitis, verisimiliter suborbicularibus, ca. 4 cm diametro, stramineis, lucidis, dissite obscureque lepidotis, laminis angustissime triangularibus, acuminatis, pungentibus, 2 cm latis, supra glabris, subtus densissime adpresseque argenteo-lepidotis, ad apicem versus integris, alibi spinis antrorsis vel retrorsis ad 2 mm longis laxe armatis; scapo erecto, 6 mm diametro, sulcato, lepidibus minutis linearibus albidis dense induto; scapi vaginis subfoliaceis, internodia multo superantibus sed scapum paulo occultantibus, infimis obscure serrulatis; inflorescentia bipinnata, anguste thyrsoides, densa, 35 cm longa, 5 cm diametro, petalis exceptis lepidibus patentibus minutis linearibus albidis dense induta; bracteis primariis linearibus, ramos infimos superantibus; ramis divergentibus, 25 mm longis, fere ad basin dense florigeris, haud secundifloris; bracteis florigeris anguste triangularibus, quam pedicellis crassiusculis 3 mm longis multo brevioribus; sepalis convolutis, reniformibus, 2.5 mm longis, late convexis, integris, crasse coriaceis, laevibus, ex sicco stramineis, lucidis; petalis 7 mm longis, quam staminibus brevioribus, lamina patente, orbiculari, convexa, indurata; capsula crasse ovoidea, longe rostrata, castanea; seminibus fusiformibus, reticulato-sculpturatis, nigris, breviter bicaudatis.

TYPE: terrestrial, frequent on northwest ridge above Camp Yutaje at 1500 m alt., Serranía Yutaje, Río Manapiare, Amazonas, Venezuela, February 23, 1953, B. & C. K. Maguire 35385.

*Pitcairnia agavifolia* L. B. Smith, sp. nov. Fig. 18.

E fragmentis solum cognita sed verisimiliter maxima; folia 94 cm longa, ensiformi, obscure lepidota, vagina parva, vix distincta, atro-castanea, serrulata, lamina acuminata, 9 cm lata, plana, crassa, spinis subrectis atris ad 3 mm longis subdense armata; scapo ignoto; inflorescentia forsan simplici, e fragmentis parvis et vetustis cognita; axi tereti, laeve, 5 mm diametro; bracteis florigeris e basibus solum cognitis sed sine dubio pedicellos superantibus; pedicellis validiusculis, 6 mm longis; floribus valde recurvatis; sepalis ex sicco subtriangularibus, ca. 25 mm longis, tenuibus, nervatis; petalis staminibusque ignotis; ovario ca.  $\frac{1}{2}$  infero; capsula sepalis superata; seminibus alatis.

TYPE: terrestrial on granite outcrop, vicinity of Intermediate Camp at 650 m alt., Cerro Sipapo (Paráque), Amazonas, Venezuela, February 6, 1949, B. Maguire & L. Politi 28788.

The leaf of *Pitcairnia agavifolia* is unique in the genus. All other species with such a broad leaf have very distinct petioles. The character of winged seeds is rare in the genus but predominant in this region. The reflexed flowers and semi-inferior ovary although not unique are still very rare in the genus.



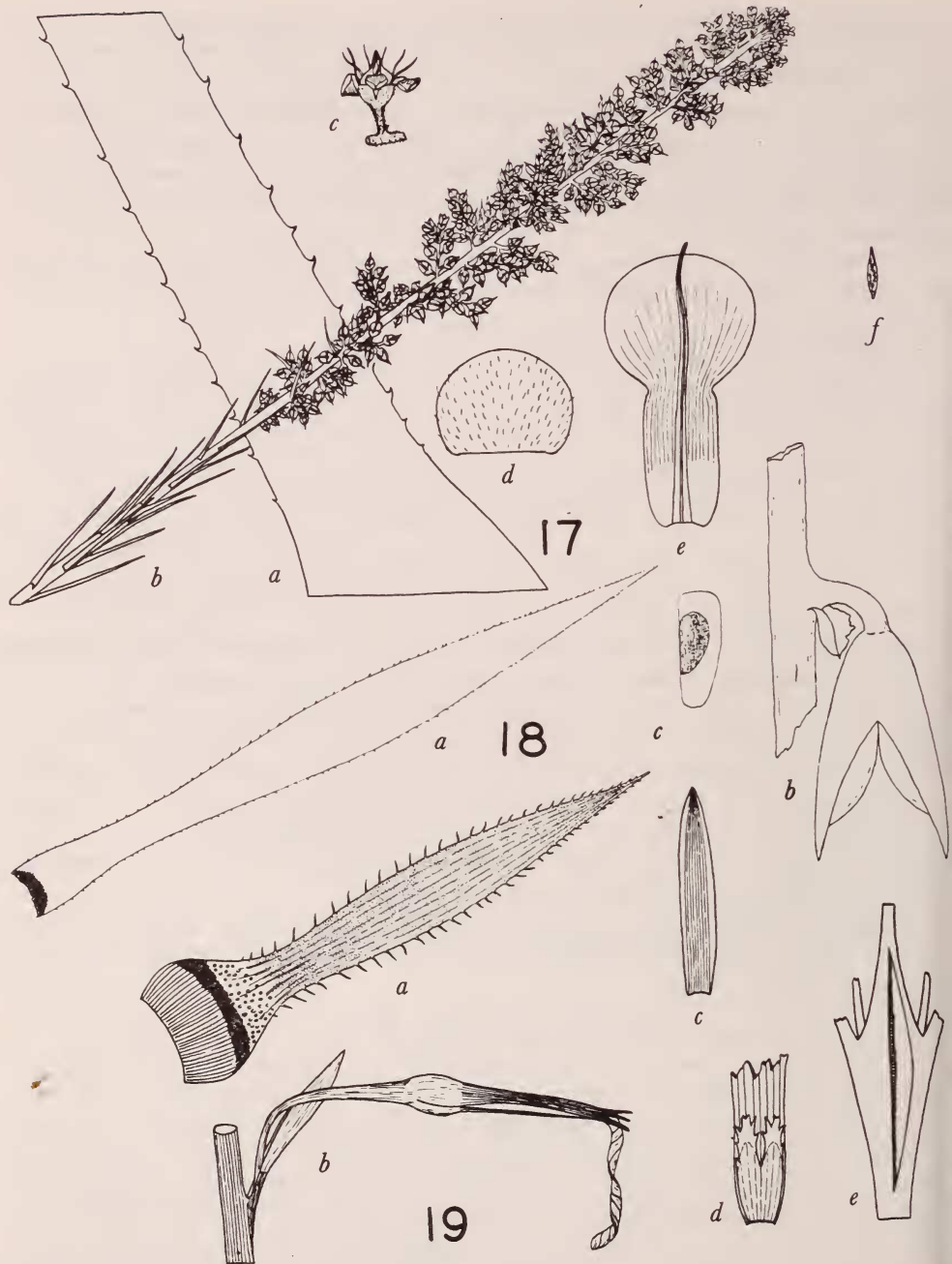


FIG. 17. *Lindmania thyrsoides* (Maguire 35385). a, portion of leaf,  $\times 1$ ; b, scape and inflorescence,  $\times \frac{1}{4}$ ; c, flower,  $\times 1$ ; d, sepal,  $\times 5$ ; e, petal and filament,  $\times 5$ ; f, seed,  $\times 5$ . FIGS. 18, 19. *Pitcairnia*. FIG. 18. *P. agavifolia* (Maguire & Politi 28788). a, leaf,  $\times \frac{1}{10}$ ; b, flower and capsule (reconstructed),  $\times 1$ ; c, seed,  $\times 5$ . FIG. 19. *P. filispina* (Maguire, Phelps, Hitchcock & Budowski 31683). a, leaf,  $\times \frac{1}{2}$ ; b, flower,  $\times 1$ ; c, sepal,  $\times 1$ ; d, base of petal,  $\times 2$ ; e, section of ovary,  $\times 2$ .

**Pitcairnia filispina** L. B. Smith, sp. nov. Fig. 19.

Acaulis, 8 dm alta; foliis multis, bulbosae rosulatis, vaginis suborbicularibus, 3-4 cm diametro, apice castaneis et cinereo-lepidotis, alibi pallido-stramineis glabrisque, laminis lineari-lanceolatis, acuminatis, basi paulo attenuatis, 14-20 cm longis, 1-2 cm latis, planis, rigidis, supra glabris, subtus dense adpressequae cinereo-lepidotis, margine spinis gracilibus patentibus 3.5 mm longis laxe armatis; scapo erecto, 5 mm diametro, glabro, rubro; scapi bracteis strictis, late ovatis, acutis vel acuminatis, internodia subaequantibus; inflorescentia simplicissima, laxa, 27 cm longa, glabra, atro-rubra; bracteis florigeris eis scapi similibus, erectis vel paulo divergentibus, pedicellos subaequantibus; pedicellis arcuato-patentibus, 2-3 cm longis, gracilibus; sepalis anguste ellipticis, acutis, 28 mm longis ecarinatis; petalis 55 mm longis, basi ligula truncata vel bifida auctis; ovario  $\frac{1}{2}$  infero; ovulis alatis.

TYPE: frequent near summit in cumbre at 1800 m alt., Cerro Guanay, Caño Guaviarito, Río Manapiare, Río Ventuari, Amazonas, Venezuela, February 2, 1951, *B. Maguire, K. D. Phelps, C. B. Hitchcock & G. Budowski 31683*.

VENEZUELA: Amazonas: frequent in small savanna along left fork of Caño Yutaje at 1250 m alt., Cerro Yutaje, Serranía Yutaje, Río Manapiare, February 12, 1953, *B. & C. K. Maguire 35176*.

Probably the nearest relative of this species is *Pitcairnia ctenophylla* L. B. Smith, but that has much narrower leaf-blades which are not at all narrowed at base, small scape-bracts much shorter than the internodes, and floral bracts much shorter than the pedicels.

**Pitcairnia epiphytica** L. B. Smith, sp. nov. Fig. 20.

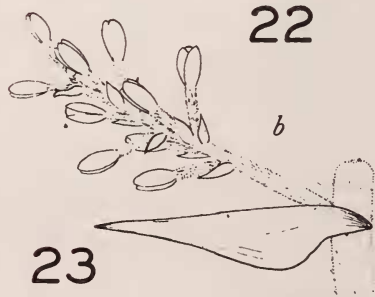
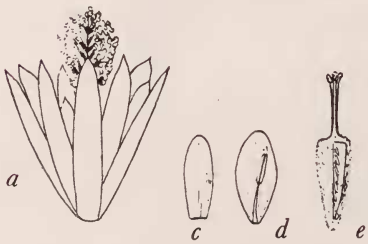
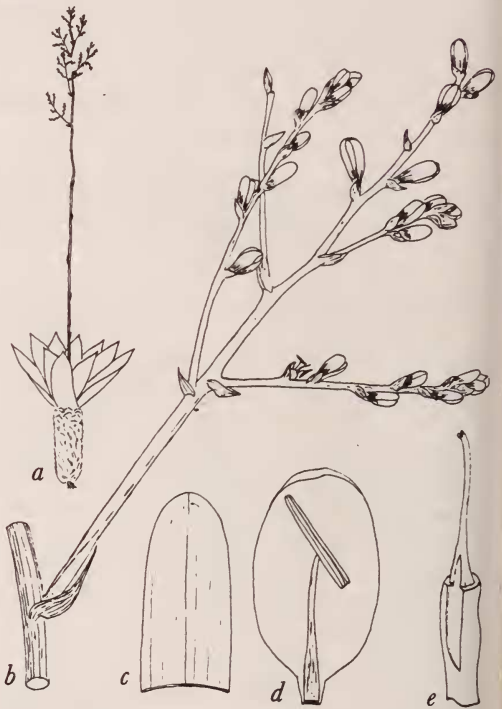
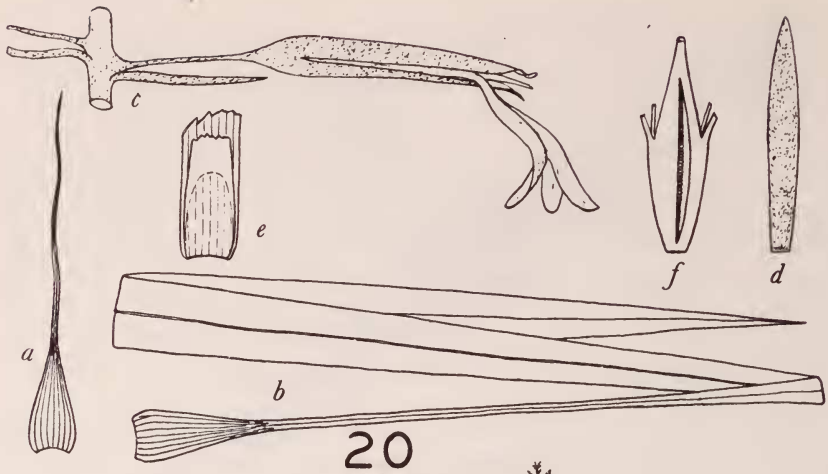
Caulescens; caule flexuoso; foliis dense imbricatis, vaginis ovatis, 4-6 cm longis, integris, atro-castaneis, dense adpressequae brunneo-lepidotis, laminis dimorphis, alteris ad flagellas parvas flexuosas gracillimas laxe serrulatas reductis, alteris longe petiolatis, lineari-lanceolatis, utrinque acuminatis, 8 dm longis, 35 mm latis, supra glabris, subtus dense adpressequae albo-lepidotis, ad apicem versus serrulatis, petiolis laxissime serratis; scapo erecto, flexuoso, albo-flocculoso; scapi bracteis internodia superantibus, lanceolatis, ad apicem versus longe acuminatis serrulatisque, viridibus; inflorescentia simplicissima, sublaxa, 4 dm long, petalis exceptis dissite albo-flocculosa; bracteis primariis infimis eis scapi similibus, floribus subaequantibus, supremis lineari-lanceolatis, pedicellos haud superantibus, tenuibus, pedicellis patentibus, gracilibus, ad 3 cm longis; sepalis lineari-lanceolatis, acutis, 30 mm longis, ecarinatis, rubris; petalis 50 mm longis, rubris, basi ligula truncata erosa auctis; ovario ca.  $\frac{1}{2}$  infero; ovulis alatis.

TYPE: epiphytic, along uppermost Río Yatua above mouth of Río Yacibo at 100-140 m alt., Amazonas, Venezuela, January 30-31, 1954, *B. Maguire, J. J. Wurdack & G. S. Bunting 37442*.

The only specimen of this species is too young to show the appropriate characters but it appears related to species with an indehiscent fruit such as *Pitcairnia lepreurii* Baker and *P. uaupensis* Baker. It differs from the former in its serrate scape-bracts and lower floral bracts and from the latter in its much broader leaf-blades and large lower floral bracts.

**Pitcairnia kunhardtiana** L. B. Smith, sp. nov. Fig. 21.

Florifera ultra 1.3 m alta; foliis 1.4 m longis, supra glabris, subtus dense adpressequae brunneo-lepidotis, subdense serrulatis, vaginis ovatis, 5 cm latis,





laminis linearibus, longe acuminatis, basi paulo angustatis, 3 cm latis; scapo robusto, albo-flocculoso, mox glabro; scapi vaginis e basi late elliptica rubra in laminam foliaceam elongatam productis, supremis remotis; inflorescentia pauciramosa, 4 dm longa, rubra; bracteis primariis suborbicularibus, apiculatis, quam ramis multo brevioribus, tenuibus, fere integris, albo-lepidotis; spicis erectis, breviter pedunculatis, anguste ovoideis, dense multifloris, 5-6 cm longis, supremis congestis, alteris valde remotis; bracteis florigeris orbicularibus, quam sepalis multo brevioribus, tenuibus, albo-lepidotis; pedicellis gracilibus, 3 mm longis; floribus strictis; sepalis lanceo-oblongis, obtusis, 14 mm longis, basi bicarinatis, nervatis, glabris; petalis sejala ad 12 mm superantibus, nudis; staminibus inclusis; ovario  $\frac{5}{8}$  supero; seminibus alatis.

TYPE: terrestrial, wet cliffs, lower central eastern drainage, 1650 m alt., Cerro Sipapo (Paráque), Amazonas, Venezuela, January 14, 1949, Maguire & Politi 28368.

There is no point in trying to place *Pitcairnia kunhardtiana* in any revision of the genus because its alate seeds and dehiscent capsule exclude all but a handful of species and its habit is quite unlike these or any other. The flowers of *P. armata* Maury from the same region are quite similar but the leaves and inflorescence are very different.

### Brocchinia

1. Ovary only one-third inferior; leaves and scape-bracts serrate. Colombia: Vaupés. *B. serrata*.
1. Ovary wholly or almost wholly inferior; leaves and bracts always entire.
  2. Leaves even above, 14-30 cm long.
    3. Inflorescence glabrous or subglabrous; petals unguiculate. 1. *B. maguirei*.
    3. Inflorescence lepidote; petals not unguiculate.
    4. Leaf-blades narrowly triangular; upper scape-bracts shorter than the internodes; sepals cucullate; inflorescence tripinnate. Venezuela: Duida. *B. vestita*.
    4. Leaf-blades ligulate; scape-bracts all much exceeding the internodes.
      5. Inflorescence tripinnate; sepals and petals obtuse. 2. *B. hitchcockii*.
      5. Inflorescence bipinnate; sepals and petals acute. 3. *B. cowanii*.
  2. Leaves prominently nerved on both sides, 20-120 cm long.
    6. Inflorescence glabrous.
      7. Leaves narrowly triangular, acuminate, 40-80 cm long, 2-3 cm wide.
        8. Leaf-sheaths prominent, 20-25 cm long, dark castaneous; ultimate branches short, densely flowered. Venezuela: Auyan-tepuí, Ptari-tepuí. *B. acuminata*.
        8. Leaf-sheaths inconspicuous, 5-8 cm long; ultimate branches elongate, laxly flowered.
          9. Leaf-blades, scape-bracts, and primary bracts uniform; leaf-sheaths green; inflorescence bipinnate; capsules sharply 3-angled. Venezuela: Duida. *B. prismatica*.
          9. Leaf-blades, scape-bracts, and primary bracts with dark castaneous, indurate, involute apices; leaf-sheaths dark castaneous; inflorescence tripinnate; capsules with subterete carpels. Venezuela: Duida, Río Cunucunuma, Río Ventuari. *B. melanacra*.

### Explanation of figures 20-23

FIGS. 20, 21. *Pitcairnia*. FIG. 20. *P. epiphytica* (Maguire, Wurdack & Bunting 37442). a, reduced leaf,  $\times \frac{1}{4}$ ; b, normal leaf,  $\times \frac{1}{4}$ ; c, flower,  $\times 1$ ; d, sepal,  $\times 1$ ; e, base of petal,  $\times 2$ ; f, section of ovary,  $\times 2$ . FIG. 21. *P. kunhardtiana* (Maguire & Politi 28368). a, lower branch of inflorescence,  $\times 1$ ; b, longitudinal section of flower,  $\times 2$ ; c, sepal,  $\times 2$ ; d, ovule,  $\times 25$ . FIGS. 22, 23. *Brocchinia*. FIG. 22. *B. maguirei* (Maguire & Politi 28301). a, habit,  $\times \frac{1}{20}$ ; b, branch of inflorescence,  $\times 1$ ; c, sepal,  $\times 5$ ; d, petal and stamen,  $\times 5$ ; e, pistil,  $\times 5$ . FIG. 23. *B. hitchcockii* (Phelps & Hitchcock 522). a, habit,  $\times \frac{1}{10}$ ; b, branch of inflorescence,  $\times 1$ ; c, sepal,  $\times 2$ ; d, petal and stamen,  $\times 2$ ; e, pistil,  $\times 2$ .

7. Leaves ligulate, rounded and apiculate, 80-120 cm long, 12-20 cm wide.  
British Guiana. *B. micrantha*.
6. Inflorescence lepidote.
10. Ovary and capsule ellipsoid, rounded at the base, sessile. Venezuela:  
Ptari-tepuí, Caroni. *B. steyermarkii*.
10. Ovary and capsule slenderly clavate, long-attenuate at the base, slenderly pedicellate.
11. Branches strict, the lowest with the basal flowers covered by the large primary bracts; inflorescence very narrow. 4. *B. cryptantha*.
11. Branches divergent or spreading, their sterile bases usually much exceeding the small primary bracts; inflorescence broad.
12. Central and secondary axes straight or the flowers secund.
13. Scales appressed, merely erose, suborbicular; sepals cucullate; petals unguiculate. Colombia, Venezuela. *B. paniculata*.
13. Scales spreading, lacerate; sepals straight.
14. Floral bracts lanceolate; acuminate, 5 mm long; sepals and petals similar; leaves rounded and apiculate; flowers mostly not secund. Venezuela. *B. tatei*.
14. Floral bracts ovate, acute, 2-3.5 mm long; sepals narrow; petals broad and unguiculate; leaves acuminate; flowers strongly secund. Venezuela; Ptari-tepuí. *B. secunda*.
12. Central and secondary axes flexuous or geniculate; flowers not secund.
15. Scape about 3 mm in diameter, its upper bracts 1-2 cm long, remote; inflorescence rarely more than bipinnate; leaves few, erect. Venezuela, British Guiana. *B. reducta*.
15. Scape much stouter, with larger bracts; inflorescence distinctly tripinnate; leaves many, spreading. Venezuela, Colombia. *B. hechtioides*.

1. *Brocchinia maguirei* L. B. Smith, sp. nov. Fig. 22.

Florifera metralis vel paulo ultra; caule erecto, robusto, 8-15 cm alto, basi-  
bus vetustis atris foliorum dense vestito; foliis apice caulis rosulatis, 2-3 dm  
longis, obscure dissiteque lepidotis, vaginis ellipticis, 6-9 cm longis, quam la-  
minis vix latioribus, basi extrema excepta viridibus, laminis ligulatis, acutis et  
subulato-incrassatis, 3-6 cm latis, ex sicco crasse coriaceis et pallide viridibus;  
scapo erecto, gracili, glabro; scapi bracteis erectis, remotis, ex ovato in apicem  
subulatum acuminatis; inflorescentia angusta, laxe tripinnatim paniculata, 3-4  
dm longa, fere glabra; bracteis primariis eis scapi similibus, quam basibus steri-  
libus nudis ramorum multo brevioribus; ramis divergentibus, gracilibus; spicis  
laxe paucifloris; bracteis florigeris late ovatis, acutis, 3 mm longis; floribus di-  
vergentibus, brevissime pedicellatis; sepalis oblongis, obtusis, 5 mm longis; pet-  
alis 6 mm longis, unguiculatis, laminis ellipticis, obtusis, albis; staminibus  
inclusis, filamentis cum sepalis petalisque brevissime connatis; ovario perjuve-  
nili solum cognito, paulo supero; stylis coalitis.

TYPE: terrestrial, flowers white, common in marshy places in savanna, Caño  
Negro, 1500 m alt., Cerro Sipapo (Paráque), Amazonas, Venezuela, January 12,  
1949, *B. Maguire & L. Politi* 28301.

The species is also represented by number 28300-A, a small specimen with the same  
data as the type and by 27817 from Southeast Ridge and savanna terraces, 1800 m alt.,  
and 27950, frequent in marshy savanna, Lower Caño Negro, 1400 m alt. A very old speci-  
men which is apparently a small narrow-leaved form of the species, is *B. Maguire, J. J.*  
*Wurdack* and *G. S. Bunting* 37242, from the summit of Cerro de la Neblina at 1700-2000 m  
alt., Río Yatua, Amazonas, Venezuela.

2. *Brocchinia hitchcockii* L. B. Smith, sp. nov. Fig. 23.

Epiphyta, verisimiliter acaulis, florifera ca 3 dm alta; foliis suberectis, 2 dm  
longis, integerrimis, subtus albo-cretaceis, vaginis haud distinctis, supra plus  
minusve albo-cretaceis; laminis ligulatis, planis, late acutis et apice valde cus-

pidatis, 4 cm latis, supra glabris; scapo brevi, foliis occulto; scapi bracteis strictis, dense imbricatis, lanceolatis, parvis sed subfoliaceis; inflorescentia dense tripinnatim paniculata, ellipsoidea, 13 cm longa, 8 cm diametro; axibus lepidibus angustissimis albidis dense vestitis; bracteis primariis e late ovatis acuminatis, pungentibus, crassis, quam ramis axillaribus subduplo brevioribus, extus albo-cretaceis; ramis simplicibus vel 2-3-furcatis, dense florigeris; bracteis florigeris ellipticis, acutis, ovarium subaequantibus, membranaceis, albis, glabris; floribus divergentibus, subsessilibus; sepalis ellipticis, obtusis, 5 mm longis, albis, tenuibus, basi sparse villosa-lepidotis; petalis ellipticis, obtusis, sepala paulo superantibus, albis, glabris; staminibus inclusis, paulo inaequalibus; ovario clavato, 5 mm longo, minime supero, dense villosa-lepidoto, stylis distinctis, gracilibus.

TYPE: on tree in *Bonnetia* forest in cumbre, 2000 m alt., Cerro Parú, Río Ventuari, Río Parú, Caño Asísa, Amazonas, Venezuela, February 11, 1949, K. D. Phelps & C. B. Hitchcock 522.

### 3. *Brocchinia cowanii* L. B. Smith, sp. nov. Fig. 24.

Florifera 4 dm alta; foliis multis, verisimiliter rosulatis, 14 cm longis, subtus dissite obscureque lepidotis, vaginis ellipticis, quam laminis vix latioribus, laminis ligulatis, acutis, apice subulato-incrassatis, 23 mm latis, supra laevibus sublucidisque; scapo ascendente, gracili; scapi bracteis erectis, internodia multo superantibus sed scapum paulo obtegentibus, e late ovato in apicem subulatum acuminatis; inflorescentia subdense bipinnata, angusta, 22 cm longa, squamis piliformibus minutis brunneis subdense oblecta; bracteis primariis eis scapi similibus, bases steriles breves ramorum paulo superantibus; ramis divergentibus, subdense florigeris, 6 cm longis, rhachi gracili, fere recta; bracteis florigeris e base late ovata brevissima in apicem triangularem attenuatis, ovarium dimidio aequantibus, albis; pedicellis brevissimis; floribus patentibus; sepalis oblongis, acutis, 6 mm longis, petala staminaque aequantibus, albis; petalis ellipticis, acutis, albis; staminibus liberis; ovario paulo supero; stylis liberis; seminibus longe caudatis.

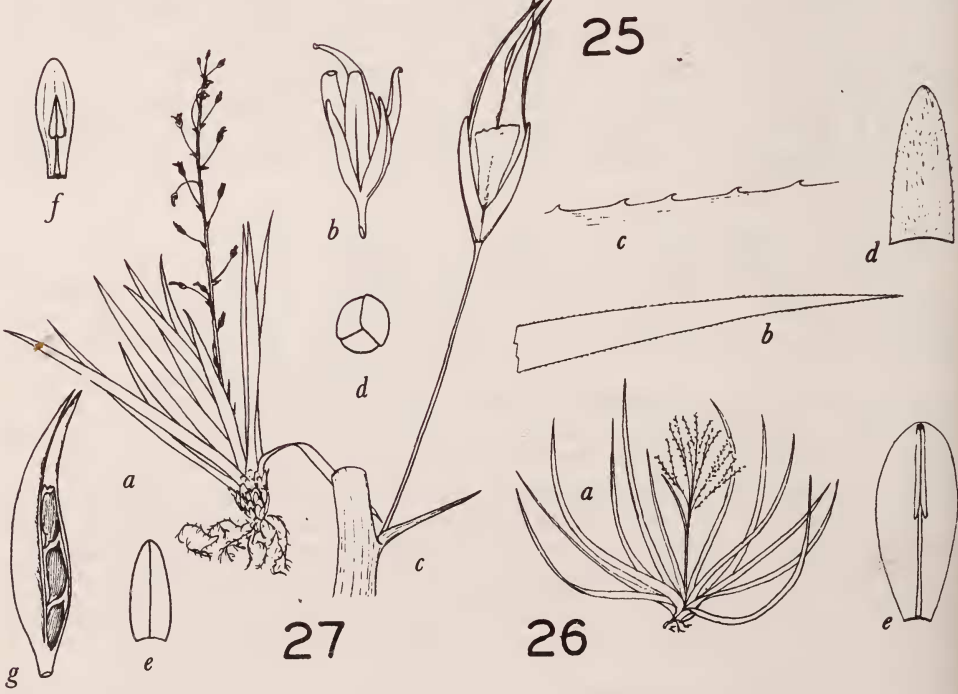
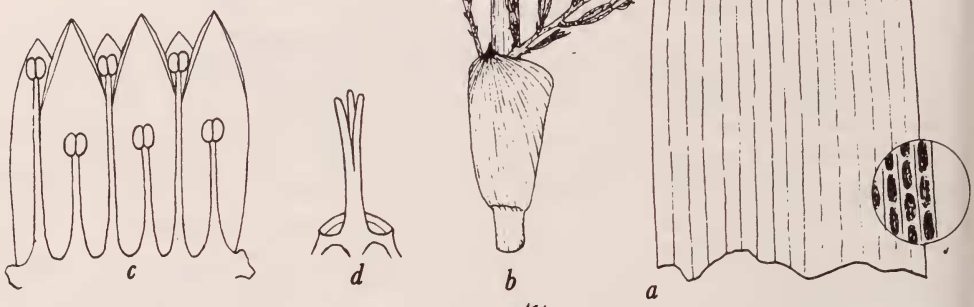
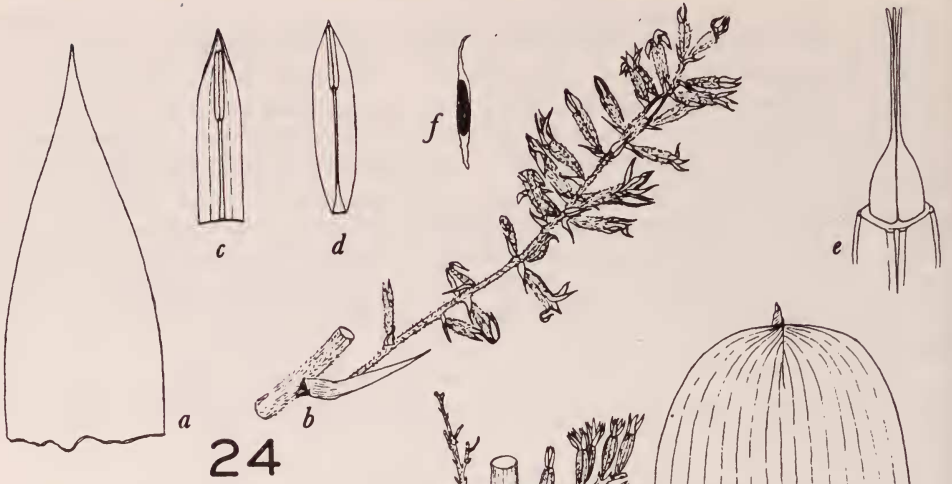
TYPE: flowers white, frequent in cumbre at 1250 m elev., Cerro Moriche, Río Ventuari, Amazonas, Venezuela, January 15, 1951, B. Maguire, R. S. Cowan & J. J. Wurdack 30924.

### 4. *Brocchinia cryptantha* L. B. Smith, sp. nov. Fig. 25.

Florifera metralis vel paulo ultra; foliis rosulatis, 5-6 dm longis, dissite minuteque lepidotis, glaucis, vaginis ellipticis, amplis, atro-castaneis, laminis ligulatis, late rotundatis et cuspidato-apiculatis, 8 cm latis, reticulatis; scapo erecto, brevi, foliis omnino occulto; inflorescentia elongata, angustissima, tripinnata, pallido-flocculosa, axi flexuosa; bracteis primariis strictis et axin involventibus, suborbicularibus, apiculatis, infimis 5 cm longis et flores basales ramorum superantibus; ramis strictis, pauciramosis vel supremis simplicibus, subdensifloris, ad 10 cm longis; bracteis florigeris e late ovato acuminatis, 3 mm longis, scariosis, nervatis; pedicellis gracilibus, bracteas aequantibus vel superantibus; floribus divergentibus; sepalis oblongis, acutis, 5 mm longis, nervatis; petalis ellipticis, sepala paulo superantibus, albis; staminibus inclusis, valde inaequalibus, filamentis cum sepalis petalisque tubum brevissimum formantibus; ovario graciliter fusiforme, tereti, omnino infero; stylis dimidio coalitis; seminibus longe caudatis.

TYPE: leaves glaucous, flowers white, frequent terrestrial in broken Cumbre at 1200 m alt., Cerro Yapacana, Río Orinoco, Amazonas, Venezuela, January 3, 1951, B. Maguire, R. S. Cowan & J. J. Wurdack 30709.





## Navia

1. Inflorescence laxly racemose or paniculate.
2. Flowering shoot less than 3 dm high.
3. Inflorescence compound, much shorter than the 34-cm-long leaves.
  1. *N. lindmanioides*.
3. Inflorescence simple, exceeding the 13-cm-long leaves.
  2. *N. fluviatilis*.
2. Flowering shoot 8–50 dm high.
4. Ovary wholly superior; flowers and branches divergent to spreading.
5. Spikes densely strobilate, 7 cm long including the sterile base.
  3. *N. hohenbergioides*.
5. Spikes not strobilate, to 26 cm long; flowers spreading, not contiguous.
6. Sepals 2–3.5 mm long.
  7. Plant 5 m high; posterior sepals carinate.
    4. *N. brocchinioides*.
  7. Plant not much if any over 1 m high; sepals ecarinate. Colombia: Caquetá.
    5. *N. hechtioides*.
    6. Sepals 10 mm long, the posterior ones alate-carinate.
      5. *N. hechtioides*.
  4. Ovary  $\frac{1}{3}$  inferior; flowers reflexed; ultimate branches pendent. Colombia: Vaupes.
    6. *N. reflexa*.
1. Inflorescence glomerate or moniliform-glomerate.
8. Inflorescence elongate, moniliform from several heads. Colombia: Araracoara.
  7. *N. caulescens*.
8. Inflorescence simple, glomerate from a single head, or several digitately arranged spikes.
9. Ovary superior.
10. Sepals free.
  11. Sepals 50 mm long; petals rose-purple in the typical variety; leaves entire, 23 mm wide. Eastern Colombia, Amazonian Brazil.
    7. *N. lopezii*.
  11. Sepals not more than 30 mm long; petals white or yellow so far as known; leaves mostly serrulate.
  12. Sepals acute or acuminate, sometimes incurved but never cucullate.
  13. Sepals 22–30 mm long; petals yellow, showy; floral bracts entire or obscurely serrulate.
    6. *N. wurdackii*.
  13. Sepals less than 22 mm long.
  14. Floral bracts serrulate or denticulate.
  15. Axils of the leaf-spines conspicuously and persistently barbellate; floral bracts strongly serrate, red; sepals acuminate; inflorescence broadly hemispheric, 3–4 cm in diameter.
  16. Sepals appressed-lepidote; leaf-blades 30 mm wide.
    7. *N. stenodonta*.
    16. Sepals sparsely tomentose with linear white trichomes; leaf-blades 6 mm wide.
      8. *N. trichodonta*.
  15. Axils of the leaf-spines not much more tomentose than the remainder of the blade.
  17. Leaf-blades 8–15 mm wide; inflorescence not obviously scapose.
  18. Sepals 8 mm long; floral bracts recurving; inflorescence green.
    9. *N. viridis*.
  18. Sepals 12–18 mm long; floral bracts straight.
  19. Inflorescence 15 mm in diameter, green. Venezuela: Duida.
    10. *N. phelpsiae*.
  19. Inflorescence 40–50 mm in diameter, pink to red.

## Explanation of figures 24–27

FIGS. 24, 25. *Brocchinia*. FIG. 24. *B. cowanii* (Maguire, Cowan & Wurdack 30924). a, apex of leaf,  $\times 1$ ; b, branch of inflorescence,  $\times 1$ ; c, sepal and stamen,  $\times 5$ ; d, petal and stamen,  $\times 5$ ; e, apex of ovary,  $\times 5$ ; f, seed,  $\times 5$ . FIG. 25. *B. cryptantha* (Maguire, Cowan & Wurdack 30709). a, apex of leaf,  $\times \frac{1}{2}$ ; b, part of inflorescence,  $\times \frac{1}{2}$ ; c, perianth and androecium,  $\times 5$ ; d, apical part of ovary,  $\times 5$ . FIGS. 26, 27. *Navia*. FIG. 26. *N. lindmanioides* (Maguire, Cowan & Wurdack 30650). a, habit,  $\times \frac{1}{10}$ ; b, apex of leaf,  $\times \frac{1}{2}$ ; c, margin of leaf,  $\times 5$ ; d, sepal,  $\times 5$ ; e, petal and stamen,  $\times 5$ ; f, pistil,  $\times 5$ . FIG. 27. *N. fluviatilis* (Maguire & Fanshawe 32360). a, habit,  $\times \frac{1}{2}$ ; b, flower,  $\times 5$ ; c, fruit,  $\times 5$ ; d, apical view of flower-bud,  $\times 5$ ; e, sepal,  $\times 5$ ; f, petal and stamen,  $\times 5$ ; g, capsule,  $\times 5$ .

17. Leaf-blades not more than 6 mm wide; petals yellow.
20. Inflorescence raised above the leaf-sheaths on an evident scape; petals slightly exceeding the sepals. 11. *N. serrulata*.
20. Inflorescence sessile; petals about twice as long as the sepals. *N. aurea*.
14. Floral bracts entire or subentire.
21. Leaf-blades 8-18 mm wide.
22. Leaf-blades serrulate.
23. Inner leaf-blades basally white or rose at anthesis; larger leaf-spines acicular. 12. *N. colorata*.
23. Inner leaf-blades wholly green like the others; leaf-spines all small, low, and broad.
24. Inflorescence conspicuously involucrate with broad, erect outer bracts; petals yellow; sepals 14 mm long; leaves white-flocculose above. 13. *N. involucreta*.
24. Inflorescence not conspicuously involucrate, its outer bracts narrow; petals white so far as known; sepals 5-19 mm long; leaves glabrous or subglabrous above.
25. Sepals 5-8 mm long; inflorescence digitate-globose from several ellipsoid spikes, many-flowered. Venezuela, Amazonian Brazil. *N. crispa*.
25. Sepals 14-19 mm long; inflorescence few-flowered, simple.
26. Leaf-blades narrowly triangular, not at all narrowed at base, 7 cm long, 9 mm wide. Venezuela: Duida. *N. glauca*.
26. Leaf-blades linear, to 37 cm long and 16 mm wide.
27. Leaf-blades sparsely tomentulose; floral bracts acuminate, pungent. British Guiana. *N. angustifolia*.
27. Leaf-blades densely cinereous-lepidote beneath; floral bracts elliptic, membranaceous. 14. *N. nubicola*.
22. Leaf-blades entire; inflorescence many-flowered; sepals 9-10 mm long.
28. Inflorescence ellipsoid, somewhat longer than broad; leaf-blades 9-10 mm wide, soon glabrous. Amazonian Brazil. *N. myriantha*.
28. Inflorescence hemispheric, broader than long; leaf-blades 15 mm wide, the margins lanate. 15. *N. lanigera*.
21. Leaf-blades 2-4.5 mm wide.
29. Leaf-blades abruptly acute or obtuse; sepals lepidote, 10-11 mm long; petals yellow. Venezuela: Duida. *N. brachyphylla*.
29. Leaf-blades evenly long-acuminate.
30. Sepals 12-14 mm long, entire.
31. Petals yellow; sepals glabrous; leaf-blades glabrous. 16. *N. pulvinata*.
31. Petals white; sepals lepidote at the apex; leaf-blades lepidote beneath. Venezuela: Duida. *N. duidae*.
30. Sepals 6 mm long, denticulate on the keel. 17. *N. saxicola*.
12. Sepals obtuse or subacute, often cucullate.
32. Leaf-blades 9-20 mm wide.
33. Keel of the posterior sepals dilated below the apex. Venezuela: Duida. *N. xyridiflora*.
33. Keel of the posterior sepals linear or gradually narrowed from base to apex.
34. Sides of the posterior sepals 1 mm wide, their keels very narrow; inflorescence few-flowered. 18. *N. pauciflora*.
34. Sides of the posterior sepals 2 mm wide.
35. Leaf-blades with a pale contrasting median stripe, linear, not cretaceous; floral bracts serrulate. 19. *N. octopoides*.



35. Leaf-blades inconspicuously striped if at all, ligulate, conspicuously cretaceous beneath.
36. Floral bracts serrulate; sepals strongly nerved, lepidote; leaf-blades 20 mm wide. 20. *N. latifolia*.
36. Floral bracts entire; sepals even, glabrous; leaf-blades 13 mm wide. 21. *N. cretacea*.
32. Leaf-blades not more than 6 mm wide.
37. Leaf-blades serrulate throughout, glabrous beneath. 22. *N. cucullata*.
37. Leaf-blades with the apical half entire, lepidote beneath at least when young.
38. Leaf-sheaths pale brown with broad hyaline margins; floral bracts elliptic, obtuse; sepals 12 mm. long. 23. *N. umbratilis*.
38. Leaf-sheaths dark castaneous; floral bracts ovate; acute; sepals 8 mm. long. 24. *N. semiserrata*.
10. Sepals connate posteriorly or equally.
39. Sepals 4–6 mm long, acute.
40. Scape evident, raising the inflorescence above the leaf-sheaths; outer bracts short. Colombia: Cerro Chiribiquete. *N. bicolor*.
40. Scape short and wholly concealed by the leaf-bases, or none.
41. Leaf-blades 17 mm wide; plants mostly simple. Colombia: Amazonas, Vaupés. *N. heliophila*.
41. Leaf-blades 2–6 mm wide; plants mostly pulvinate.
42. Leaf-blades abruptly acute, 6 mm wide. Colombia: Araracoara. *N. acaulis*.
42. Leaf-blades acuminate, 2–3 mm wide.
43. Floral bracts much exceeding the sepals; leaf-blades soon deciduous and exposing the branched stem, 3 cm long. Colombia: Cerro del Castillo. *N. schultesiana*.
43. Floral bracts shorter than the sepals; leaf-blades persistent and concealing the stem, 7 cm long. Colombia: Chiribiquete. *N. graminifolia*.
39. Sepals 10–16 mm long.
44. Leaf-blades serrulate throughout.
45. Leaf-blades densely cinereous-lepidote beneath, abruptly acute or obtuse. 25. *N. mima*.
45. Leaf-blades soon glabrous.
46. Inner leaf-blades white at the base and forming an eye about the inflorescence.
47. Leaf-blades 8–10 mm wide; stems mostly branched and plants cushion-forming. 26. *N. pungens*.
47. Leaf-blades 1–2 mm wide, not narrowed toward the base; stems simple. 27. *N. ocellata*.
46. Inner leaf-blades concolorous like the others, narrowed toward base; sepals more than half connate.
48. Leaf-blades with a conspicuous brown cartilaginous margin, densely and distinctly serrulate. 28. *N. sandwithii*.
48. Leaf-blades with an inconspicuous almost colorless margin, laxly and obscurely serrulate. Suriname: Tafelberg. *N. maguirei*.
44. Leaf-blades entire or with a few obscure teeth near the base or the apex.
49. Sepals obtuse, 16 mm long; leaf-blades 14 mm wide. 29. *N. subpetiolata*.
49. Sepals acute, 10–12 mm long; leaf-blades 3–5 mm wide.
50. Leaf-blades spreading, flat, 5 mm wide; floral bracts wholly membranaceous. British Guiana, Venezuela. *N. gleasonii*.
50. Leaf-blades strict, involute, 3 mm wide; floral bracts subulate-thickened at the apex. 30. *N. caricifolia*.
9. Ovary partly or almost wholly inferior.
51. Sepals 28–30 mm long.
52. Ovary only  $\frac{1}{2}$  inferior; sepals linear, dilated and denticulate at the apex. 31. *N. immersa*.

52. Ovary almost wholly inferior; sepals narrowly triangular, acuminate, entire, auricled at the base. Colombia: Amazonas-Vaupés. *N. fontoides*.
51. Sepals 7-15 mm long.
53. Leaf-blades 9 mm wide; stems normally elongate. 32. *N. aloifolia*.
53. Leaf-blades 3-6 mm wide; stems short.
54. Leaves 2-5 cm long. 33. *N. parvula*.
54. Leaves 14 cm long. 34. *N. scopulorum*.

1. *Navia lindmanioides* L. B. Smith, sp. nov. Fig. 26.

Humilis; foliis multis, ad 34 cm longis, inflorescentiam multo superantibus, dense serrulatis, basi dissite minuteque albo-stellatis, mox glabris, vaginis parvis, suborbicularibus, brunneis, laminis linearibus, acuminatis, 15 mm latis; scapo erecto, brevi, ca. 1.5 mm diametro, minute albo-stellato, bractea unica subfoliacea paulo infra apicem aucto, alibi nudo; inflorescentia subdigitatim paniculata, tripinnata, 9-12 cm longa, dense albo-stellata; bracteis primariis infimis linearibus, serrulatis, quam ramis multo brevioribus, supremis ovatis quam eis florigeris vix majoribus; ramis subpatentibus, pauciramosis, laxe florigeris; bracteis florigeris late ovatis, acutis, 2 mm longis, tenuibus; pedicellis brevissimis crassisque; floribus patentibus; sepalis cochleari-imbricatis, liberis, oblongo-ovatis, obtusis, 4 mm longis, tenuibus; petalis ellipticis, obtusis, 5 mm longis, stamina aequantibus, albis; ovario supero, globoso, lepidoto; ovulis paucis.

TYPE: flowers white, frequent along base of escarpment at 1000 m alt., Cerro Yapacana, Río Orinoco, Amazonas, Venezuela, January 3, 1951, *B. Maguire, R. S. Cowan & J. J. Wurdack* 30650.

Number 30619 from the same locality is this species. The collectors note that the leaves are asymmetrically arranged.

2. *Navia fluviatilis* L. B. Smith, sp. nov. Fig. 27.

Humilis, acaulis, verisimiliter annua, florifera 12-21 cm alta; foliis ca. 15, suberectis, ad 13 cm longis, graminiformibus, omnino inermibus, lepidibus minutissimis dissite obtectis, vaginis ovatis, 8 mm longis, pallide brunneis, laminis linearibus, acuminatis, planis, 5 mm latis; scapo erecto, gracillimo, quam foliis multo brevioribus; scapi vaginis anguste lanceolatis, apice acuto incrassato excepto membranaceis, supremis quam internodiis brevioribus; inflorescentia simplici, laxe racemosa, glabra; bracteis florigeris eis scapi similibus, quam pedicellis duplo vel triplo brevioribus; pedicellis adscendentibus, gracillimis, 6-7 mm longis; sepalis liberis, anguste oblongis, obtusis, 2.5 mm longis, subhyalinis, juvenilibus cochleari-imbricatis; petalis anguste ellipticis, obtusis, sepala paulo superantibus, albis; staminibus inclusis; ovario supero; stylo gracili; capsula graciliter fusiformi, acuminata; seminibus angustis, fere vel omnino nudis, nigris.

TYPE: locally frequent on exposed sandstone boulders in stream bed, 1000 m alt., Membaru-Kurupung Trail, Pakaraima Mountains, British Guiana, October 29-November 4, 1951, *B. Maguire & D. B. Fanshawe* 32360.

3. *Navia hohenbergioides* L. B. Smith, sp. nov. Fig. 28.

Florifera ad 4 m alta; caule erecto, 1 m alto, 3 cm diametro; foliis ultra 6 dm longis, obscurissime dissiteque lepidotis, vaginis quam laminis laevioribus et cum spinis pallidis sed vix distinctis, laminis linearibus, acuminatis, pungentibus, 3 cm latis, nervatis, spinis atris sursum curvatis 2 mm longis laxe armatis; scapo erecto, ca. 3 cm diametro, glabro; scapi bracteis strictis, dense imbricatis, dense serratis, infimis anguste triangularibus, supremis lanceolatis; inflorescentia ample laxequae tripinnatim paniculata, glabra; axi recto; bracteis primariis

supremis scapi similibus, quam basibus sterilibus ramorum multo brevioribus; ramis divergentibus, ultra 5 dm longis, laxe ramosis, basi sterili elongata, 4-7 bracteata; bracteis secundariis ovatis, acuminatis, pedunculis spicium paulo superantibus; spicis arcuato-patentibus, densissime cylindricis, 4-6 cm longis; bracteis florigeris late ovatis, acuminatis, sepala superantibus, basi carinatis, obscure serrulatis; pedicellis obconicis, brevibus; sepalis liberis, late ellipticis, acutis, 6 mm longis, coriaceis, posterioribus alato-carinatis; petalis 11 mm longis; staminibus inclusis; ovario supero; capsula globosa, quam sepalis subduplo brevioribus; seminibus paucis, nudis vel angustissime alatis.

TYPE: inflorescence paniculate, to 4 m tall, caudex to 1 m high, 3 cm diameter, frequent on dry rocky lower slopes at 200 m alt., Cerro Moriche, Río Ventuari, Amazonas, Venezuela, January 16, 1951, *B. Maguire, R. S. Cowan & J. J. Wurdack* 30970. Also collected here on March 9, 1953, *B. & C. K. Maguire* 35535.

I regard this as a primitive type in a genus which has evolved by reduction of floral axes and loss of seed-appendages.

#### 4. *Navia brocchinioides* L. B. Smith, sp. nov. Fig. 29.

Caulescens ad 1 m, florifera 5 m alta; foliis ultra 1.5 m longis, vaginis vix distinctis, late ovatis, 11 cm latis, integris, pallido brunneis, subtus adpresse lepidotis, laminis linearibus, acuminatis, glabris, supra basin paulo angustatis, basi extrema spinis uncinatis atris 3 mm longis subdense armatis, alibi integerrimis; scapo 3 cm vel ultra diametro; scapi bracteis erectis, foliaceis, dense imbricatis; inflorescentia laxissime 4-pinnatim paniculata; bracteis primariis anguste triangularibus, quam basibus sterilibus nudis ramorum brevioribus; ramis ad 53 cm longis; spicis subdense multifloris, ad 26 cm longis; bracteis florigeris e late ovato acuminatis, infimis sepala subaequantibus; floribus patentibus, subsessilibus; sepalis liberis, cochleari-imbricatis, late ovatis, obtusis, 3.5 mm longis, posterioribus carinatis; petalis 6 mm longis; staminibus inclusis; ovario supero, crasse ovoideo, stylo elongato.

TYPE: terrestrial, infreque in sabanita along granite outcrop, streamside, 650 m alt., Cerro Sipapo (Paráque), Amazonas, Venezuela, February 6, 1949, *B. Maguire & L. Politi* 28787.

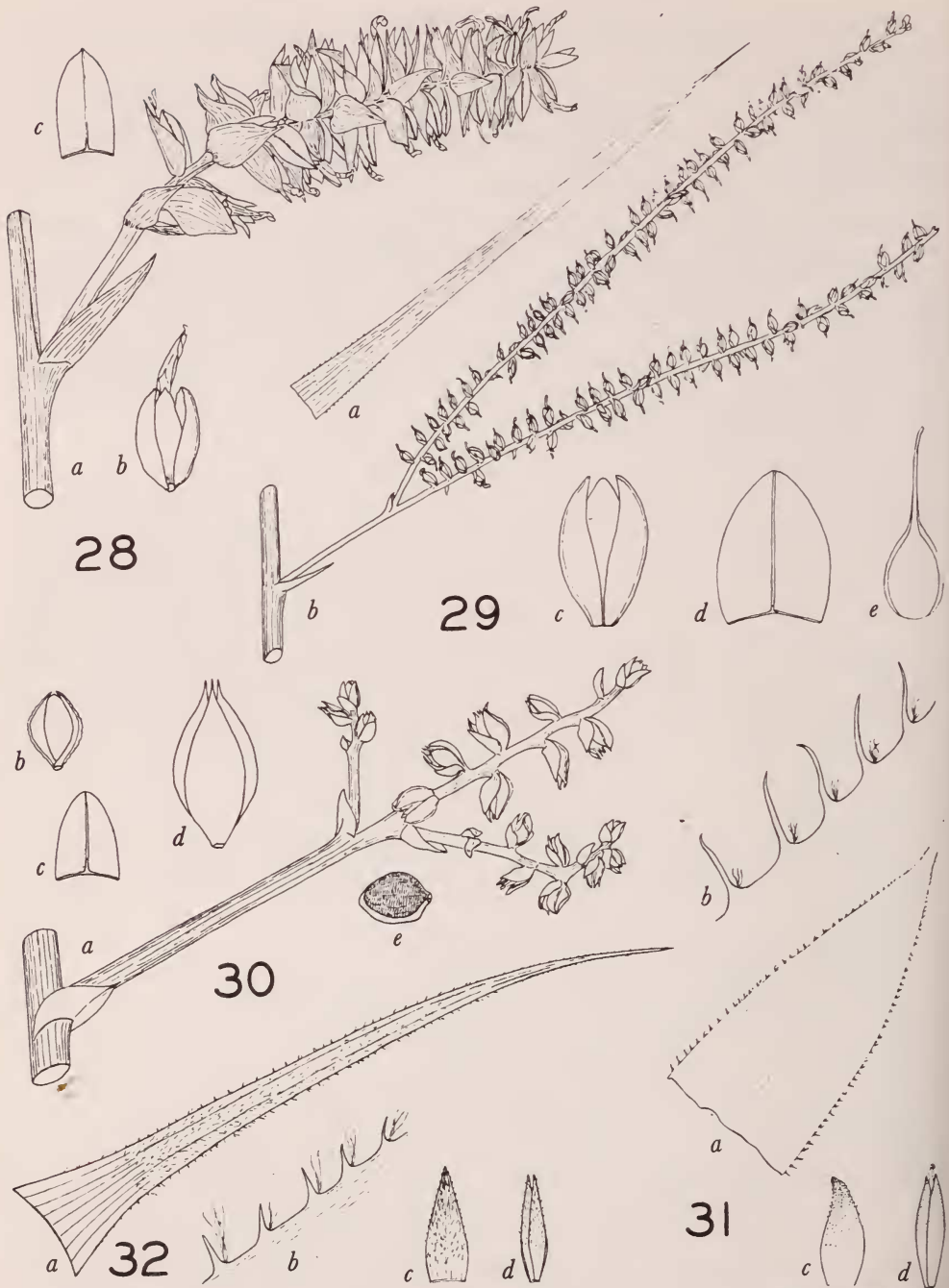
#### 5. *Navia hechtioides* L. B. Smith, sp. nov. Fig. 30.

Florifera 3 m alta; foliis fere 1 m longis, vaginis brevibus, 6 cm latis, integris, pallide adpresseque lepidotis, laminis linearibus, 4 cm latis, basi nullo modo angustatis, in apicem crassum pungentem acuminatis, spinis subrectis atris 3 mm longis laxe armatis, supra mox glabris, subtus minutissime albo-lepidotis; scapo ignoto; inflorescentia laxissime tripinnatim paniculata, glabra; bracteis primariis late ovatis, cuspidato-acutis, quam basibus sterilibus nudis elongatis ramorum multo brevioribus; ramis patentibus; spicis patentibus, laxifloris; rhachi valde angulata; bracteis florigeris late ovatis, acutis, quam sepalis brevioribus; floribus patentibus, brevissime crasseque pedicellatis; sepalis cochleari-imbricatis, late ovatis, 10 mm longis, posterioribus alato-carinatis; petalis incompletis solum cognitis; ovario supero, crasse ovoideo; seminibus angustissime alatis, alis deciduis.

TYPE: open scrub savanna, Campo Grande, 1500 m alt., Cerro Sipapo (Paráque), Amazonas, Venezuela, December 10, 1948, *B. Maguire & L. Politi* 27574.

#### 7. *Navia stenodonta* L. B. Smith, sp. nov. Fig. 31.

Humilis; foliis 2 dm longis, pilis albis minutissimis dissite vestitis, vaginis brevibus, late ovatis, brunneis, laminis lineari-oblongis, acutis vel acuminatis, pungentibus, 3 cm latis, spinis patentibus gracilibus pallidis 4 mm longis sub-



FIGS. 28-32. *Navia*. FIG. 28. *N. hohenbergioides* (Maguire, Cowan & Wurdack 30970). a, branch of inflorescence,  $\times 1$ ; b, flower,  $\times 2$ ; c, posterior sepal,  $\times 2$ . FIG. 29. *N. brochinioides* (Maguire & Politi 28787). a, leaf,  $\times \frac{1}{20}$ ; b, branch of inflorescence,  $\times \frac{1}{2}$ ; c, flower,  $\times 5$ ; d, posterior sepal,  $\times 5$ ; e, pistil,  $\times 5$ . FIG. 30. *N. hechtioides* (Maguire & Politi 27574). a, branch of inflorescence,  $\times \frac{1}{2}$ ; b, young flower,  $\times 2$ ; c, posterior sepal,  $\times 2$ ; d, capsule,  $\times 2$ ; e, seed,  $\times 5$ . FIG. 31. *N. stenodonta* (Cowan & Wurdack 31357). a, apex of leaf,  $\times 1$ ; b, margin of leaf,  $\times 5$ ; c, floral bract,  $\times 1$ ; d, flower,  $\times 1$ . FIG. 32. *N. trichodonta* (Maguire, Cowan & Wurdack 30228). a, leaf,  $\times 1$ ; b, margin of leaf,  $\times 5$ ; c, floral bract,  $\times 1$ ; d, posterior sepals,  $\times 1$ .



dense armatis, axillis spinarum albo-barbellatis; scapo brevi, nudo; inflorescentia densissime hemisphaerica, 3-4 cm diametro; bracteis exterioribus ex ovato acuminatis, subfoliaceis, flores aequantibus vel superantibus; bracteis florigeris ovatis, acutis, sepala paulo superantibus, pectinato-serratis, rubris, lepidibus pallidis adpressis vestitis, apice recurvatis; sepalis liberis, lanceolatis, acuminatis, 14 mm longis, nervatis, rubris, albo-lepidotis, posterioribus alato-carinatis; petalis albis; staminibus inclusis; ovario supero.

TYPE: leaves glaucous above and below, bracts pink, flowers white, stamens yellow, infrequent along west rim of cumbre at 2000 m alt., Serranía Parú, Río Parú, Caño Asísa, Río Ventuari, Amazonas, Venezuela, February 7, 1951, *R. S. Cowan & J. J. Wurdack 31357*.

8. *Navia trichodonta* L. B. Smith, sp. nov. Fig. 32.

Caulescens; foliis 8-13 cm longis, pilis albis minutis vestitis, vaginis brevibus, late ovatis, brunneis, laminis linearibus, acuminatis, 6 mm latis, spinis pallidis 0.7 mm longis laxe armatis, axillis spinarum albo-barbellatis; scapo 1 cm. longo, foliis omnino occulto; inflorescentia densissime hemisphaerica, 3-4 cm diametro, bipinnata, albo-pilosa; bracteis exterioribus foliis similibus sed valde reductis; bracteis florigeris ovatis, acutis, sepala superantibus, serrulatis, rubris; floribus breviter pedicellatis; sepalis liberis, lanceolatis, rectis, acuminatis, 15 mm longis, nervatis, rubris, posterioribus anguste alato-carinatis; petalis albis; staminibus inclusis; ovario supero.

TYPE: bracts pink, flowers white, frequent in dry places under overhanging cliffs near summit of South Escarpment, Cerro Huachamacari, Rio Cunucunuma, Amazonas, Venezuela, Dec. 14, 1950, *Maguire, Cowan & Wurdack 30228*.

This species is also represented by number 29798 from the same locality at 1300 m alt.

9. *Navia viridis* L. B. Smith, sp. nov. Fig. 33.

Verisimiliter humilis; caule ignoto; foliis 5 dm longis, vaginis late ovatis, brevibus, brunneis, glabris, laminis linearibus, caudato-acuminatis, 10 mm latis, spinis patentibus pallidis ad 1 mm longis laxe armatis, supra glabris, subtus pilis albis minutis dissite vestitis, linea mediana lata pallida pictis; inflorescentia sessili, subglobosa, 25 mm diametro, e spicis brevissimis digitatim bipinnata, glabra; bracteis exterioribus foliaceis sed valde reductis; bracteis florigeris late ovatis, acuminatis et apice incrassatis, sepala superantibus sed apice reflexis, serrulatis, nervatis, viridibus; pedicellis brevibus, latis; sepalis liberis, cochleari-imbricatis, lanceolatis, acutis, 8 mm longis, valde nervatis, viridibus, posterioribus late alato-carinatis; petalis albis, imperfecte cognitis; ovario supero.

TYPE: terrestrial, flowers white, leaves pellucid green, frequent along Caño Culebra at 1400 m alt., Cerro Duida, Amazonas, Venezuela, April 24, 1949, *B. Maguire & B. Maguire, Jr. 29078*.

10. *Navia phelpsiae* L. B. Smith, sp. nov. Fig. 34.

Verisimiliter humilis; caule ignoto; foliis multis, 3 dm longis, supra glabris, subtus lepidibus linearibus sparse inconspicueque vestitis, vaginis inconspicuis quam laminis paulo latioribus, laminis linearibus, caudato-acuminatis, 15 mm latis, linea mediana lata pictis, spinis patentibus pallidis ad 1.5 mm longis laxe armatis, axillis spinarum infimarum barbellatis; inflorescentia sessili, hemisphaerica, 4-5 cm diametro, e spicis brevissimis digitatim bipinnata, mox glabra; bracteis rubris, dense serrulatis, exterioribus subfoliaceis sed valde reductis, bracteis florigeris lanceolatis vel ovatis, acuminatis, rectis, sepala superantibus, dense serrulatis, subcoriaceis; pedicellis brevissimis; sepalis liberis, lanceola-

tis, acutis, 12-18 mm longis, nervatis, rubris, posterioribus anguste alato-carinatis, petalis staminibusque ignotis; ovario supero.

TYPE: on rocks in scrub woodland, south escarpment slopes, Cerro Guanay, 1200-1800 m alt., Caño Guaviarito, Río Manapiare, Río Ventuari, Amazonas, Venezuela, February 4, 1951, *B. Maguire, K. D. Phelps, C. B. Hitchcock & G. Budowski 31762*.

VENEZUELA: Amazonas: Cerro Yutaje: occasional in thickets near Camp Yutaje at 1300 m alt., February 8, 1953, *B. & C. K. Maguire 35090*. Frequent in shaded places along caño or in woodland, along left fork of Caño Yutaje at 1250 m February 12, 1953, *B. & C. K. Maguire 35216*. Frequent in left branch of Caño Yutaje at 1200 m alt., February 25, 1953, *B. & C. K. Maguire 35416*.

In the material from Cerro Yutaje the minute linear white trichomes of the inflorescence are much more persistent than in the type.

11. *Navia serrulata* L. B. Smith, sp. nov. Fig. 35

Habitus ignotus; foliis plurimis, 36 cm longis, vaginis late ellipticis, 2 cm longis, quam laminis multo latioribus, apice brunneis serrulatisque, laminis linearibus, longe acuminatis, 5-6 mm latis, dense minuteque serrulatis, subtus dense albo-lepidotis; scapo gracili, vaginas foliorum superante; inflorescentia myriantha, verisimiliter simplex, crasse ovoidea, late obtusa, 25 mm longa, glabra; bracteis exterioribus subfoliaceis, inflorescentiam involucrentibus et superantibus; bracteis florigeris lanceolatis, acutis, quam sepalis paulo brevioribus, serrulatis; pedicellis brevissimis; sepalis liberis, lanceolatis, acutis, 7-9 mm longis; petalis sepala vix superantibus; antheris exsertis, linearibus, 3 mm longis; ovario supero.

TYPE: bracts pinkish, flowers yellowish, frequent on northwest slopes at 800 m alt., Cerro Yapacana, Río Orinoco, Amazonas, Venezuela, January 1, 1951, *B. Maguire, R. S. Cowan & J. J. Wurdack 30521*.

VENEZUELA: Amazonas: common on rocks in more exposed woodland below Intermediate Camp at 800-1000 m, Cerro Yutaje, Serranía Yutaje, Río Manapiare, February 4, 1953, *B. & C. K. Maguire 35056*.

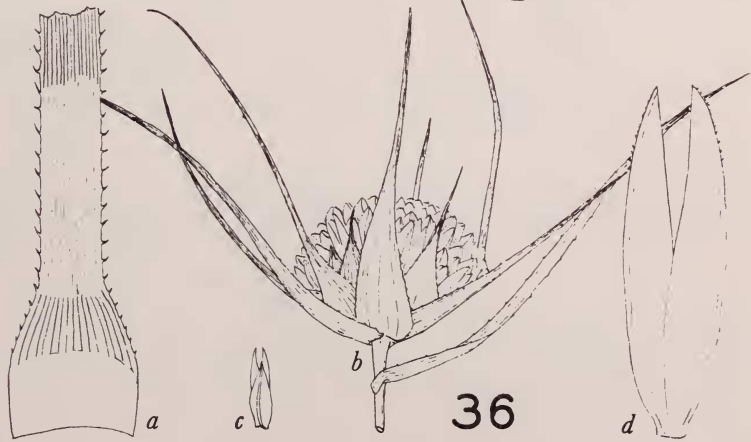
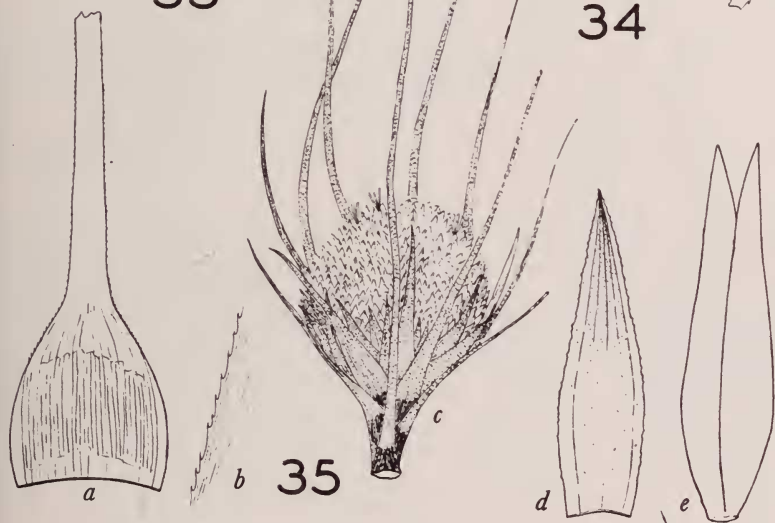
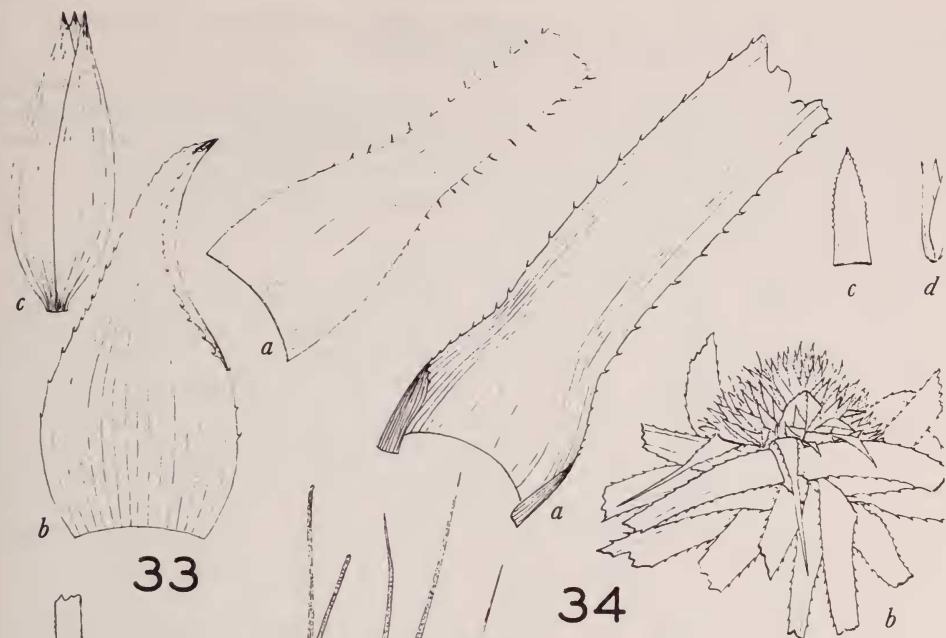
12. *Navia colorata* L. B. Smith, sp. nov. Fig. 36.

Caulescens, ramosa; foliis in rosulis terminalibus, 15-25 cm longis, subtus et basi supra pilis minutis albis dissite vestitis, foliis interioribus cum bracteis basi albis vel rubris et aream coloratam magnam circa inflorescentiam formantibus, vaginis parvis, late ovatis, brunneis, laminis linearibus, longe acuminatis, 8-11 mm latis, spinis gracilibus pallidis 0.5-1.5 mm longis subdense armatis, scapo brevi, nudo; inflorescentia subhemisphaerica, 15-25 mm diametro, bipinnata, multiflora; bracteis exterioribus subfoliaceis, inflorescentiam involucrentibus et multo superantibus; bracteis florigeris ovatis, acutis, 7-8 mm longis, integris, apice lepidotis; pedicellis brevibus, latis; sepalis liberis, lanceolatis, acutis, 9 mm longis, apice inflexis lepidotisque, posterioribus anguste alato-carinatis; petalis aureis; ovario supero.

TYPE: flowers yellow, leaves around flowering heads white basally, turning green in the next seasons, on cliffs at the base of the escarpment at 1800 m alt.,

Explanation of figures 33-36

FIGS. 33-36. *Navia*. FIG. 33. *N. viridis* (*Maguire & Maguire 29078*). a, base of leaf,  $\times 1$ ; b, floral bract  $\times 5$ ; c, sepals,  $\times 5$ . FIG. 34. *N. phelpsiae* (*Maguire, Phelps, Hitchcock & Budowski 31762*). a, base of leaf,  $\times 1$ ; b, inflorescence,  $\times \frac{1}{2}$ ; c, floral bract,  $\times 1$ ; d, sepals,  $\times 1$ . FIG. 35. *N. serrulata* (*Maguire, Cowan & Wurdack 30521*). a, base of leaf,  $\times 1$ ; b, margin of leaf,  $\times 5$ ; c, inflorescence,  $\times 1$ ; d, floral bract,  $\times 5$ ; e, posterior sepals,  $\times 5$ . FIG. 36. *N. colorata* (*Cowan & Wurdack 31417*). a, base of leaf,  $\times 1$ ; b, inflorescence,  $\times 1$ ; c, floral bract and sepals,  $\times 1$ ; d, posterior sepals,  $\times 5$ .



Serranía Parú, Río Parú, Caño Asísa, Río Ventuari, Amazonas, Venezuela, February 12, 1951, *R. S. Cowan & J. J. Wurdack 31417*.

The species is also represented from this region by number 31262, 1-4 rosettes per caudex, basal half of central leaves rose-colored, frequent in open rocky sabanitas along West Rim, cumbre at 2000 m alt.; and by number 31358, flowers yellow, interior leaves basally pink, apically red-green, occasional along West Rim, cumbre at 2000 m alt.

An unnumbered collection of the species was made in this locality by *K. D. Phelps* and *C. B. Hitchcock* on February 11, 1949.

13. *Navia involucrata* L. B. Smith, sp. nov. Fig. 37

Humilis; foliis multis, 17 cm longis, vaginis late ovatis, brevibus, brunneis, laminis anguste triangularibus, acuminatis, pungentibus, 18 mm latis, dense serrulatis, concoloribus, supra dense minuteque albo-flocculosis, subtus mox glabris; scapo gracili, 20-25 mm longo, nudo; inflorescentia hemisphaerica, 2-3 cm diametro; bracteis exterioribus e base late ovata acuminatis, serrulatis, crasse coriaceis, ex sicco flavis, inflorescentiam involucrantibus longe superantibus et fere omnino obtegentibus; bracteis florigeris lanceolatis, acutis, sepala subaequantibus, integris, parte superiore incrassata, minute lepidota; pedicellis brevibus; sepalis liberis, lanceolatis, acutis, 14 mm longis, apice lepidotis, posterioribus carinatis, basi anguste alatis, apice obscure dentatis; petalis aureis, stamina subaequantibus; ovario supero.

TYPE: flowers yellow, frequent along cumbre of West Rim at 2000 m alt., Serranía Parú, Río Parú, Caño Asísa, Río Ventuari, Amazonas, Venezuela, February 7, 1951, *Cowan & Wurdack 31359*.

Number 31360 is fruiting material of this species from the same place, and *K. D. Phelps* and *C. B. Hitchcock 527* is immature.

14. *Navia nubicola* L. B. Smith, sp. nov. Fig. 38.

Breviter caulescens; caule simplici; foliis ex comparatione paucis, ad 38 cm longis, vaginis parvis, late ovatis, laminis linearibus, acuminatis, basi attenuatis, 16 mm latis, ex sicco tenuibus, subdense serrulatis, linea mediana pallida pictis, supra glabris, subtus dense adpresseque cinereo-lepidotis; inflorescentia nidulante, globosa sed subpauciflora, 20-25 mm diametro, simplici; bracteis exterioribus subfoliaceis, inflorescentiam superantibus; bracteis florigeris ellipticis, sepala superantibus, integris, membranaceis, apice dense lepidotis; floribus subsessilibus; sepalis liberis, lanceolatis, late acutis, 14 mm longis, apice inflexis et dense lepidotis, membranaceis, lateralibus anguste carinatis; petalis albis; ovario supero; capsula ellipsoidea, rostro brevi excluso 5 mm longa.

TYPE: terrestrial, flowers white, locally abundant in slope forest between Camps 2 and 3 at 200-500 m alt., Cerro de la Neblina, Río Yatua, Amazonas, Venezuela, January 29, 1954, *B. Maguire, J. J. Wurdack & G. S. Bunting 37392*.

The species is further represented by numbers 37382 and 36801 from the vicinity of the type locality.

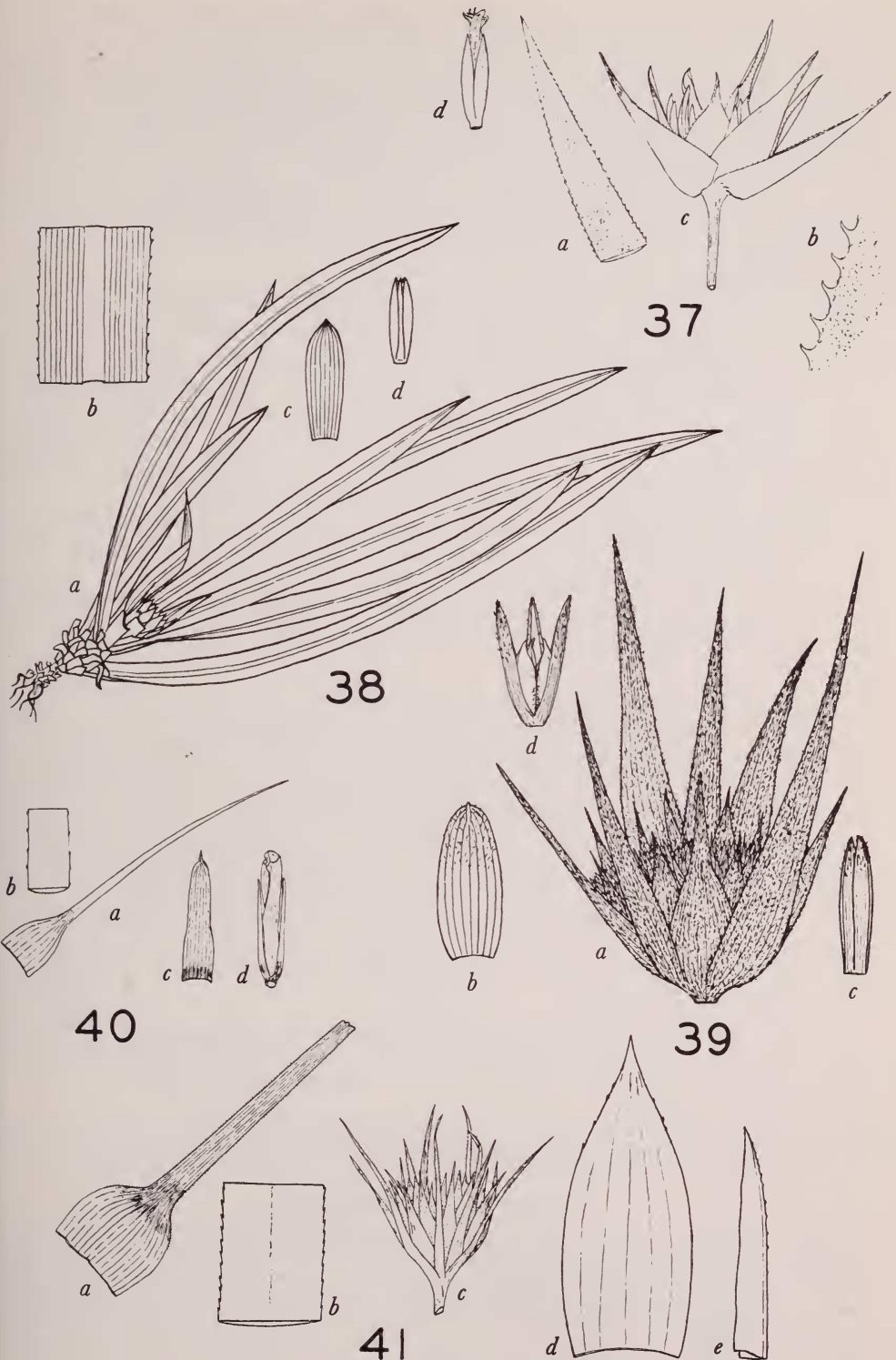
15. *Navia lanigera* L. B. Smith, sp. nov. Fig. 39.

Imperfecte solum cognita, verisimiliter caulescens; laminis foliorum angus-

Explanation of figures 37-41

FIGS. 37-41. *Navia*. FIG. 37. *N. involucrata* (*Cowan & Wurdack 31359*). a, apex of leaf,  $\times 1$ ; b, margin of leaf,  $\times 5$ ; c, inflorescence,  $\times \frac{1}{2}$ ; d, flower,  $\times 1$ . FIG. 38. *N. nubicola* a, habit,  $\times \frac{1}{4}$ ; b, part of leaf,  $\times 1$ ; c, floral bract,  $\times 1$ ; d, sepals,  $\times 1$ . FIG. 39. *N. lanigera* (*Maguire, Phelps, Hitchcock & Budowski 31794*). a, inflorescence,  $\times 1$ ; b, floral bract,  $\times 2$ ; c, posterior sepals,  $\times 2$ ; d, fruit,  $\times 2$ . FIG. 40. *N. pulvinata* (*Maguire & Maguire 29111*). a, leaf,  $\times 1$ ; b, part of leaf,  $\times 5$ ; c, outer bract of inflorescence,  $\times 1$ ; d, flower,  $\times 1$ . FIG. 41. *N. saxicola* (*Maguire, Cowan & Wurdack 30680*). a, base of leaf,  $\times 1$ ; b, part of leaf,  $\times 5$ ; c, inflorescence,  $\times 1$ ; d, floral bract,  $\times 5$ ; e, posterior sepal,  $\times 5$ .





tissime triangularibus, 18 cm longis, 15 mm latis, integris, margine dense albolanatis, supra glabris, subtus albo-flocculosis; inflorescentia nidulante, hemisphaerica, multiflora, 3 cm diametro, albo-flocculosa; bracteis exterioribus, subfoliaceis, flores multo superantibus; bracteis florigeris ellipticis, acutis, sepala subaequantibus, integris, apice incrassatis; sepalis liberis, lanceolatis, acutis, apice inflexis, 9 mm longis, tenuibus; ovario supero.

TYPE: frequent on rocks on summit at 1800 m alt., Cerro Camani, Caño Guaviarito, Río Manapiare, Río Ventuari, Amazonas, Venezuela, February 12, 1951, B. Maguire, K. D. Phelps, C. B. Hitchcock & G. Budowski 31794.

16. *Navia pulvinata* L. B. Smith, sp. nov. Fig. 40.

Humilis, pulvinata; caule ramoso, foliis vetustis persistentibus dense oblecto; foliis vivis plurimis, in apicibus caulis rosulatis, glabris, vaginis parvis, late ovatis, pallide brunneis, subhyalinis, laminis patentibus, linearibus, acuminatis, 4 cm longis, basi vix 2 mm latis, minutissime laxequae serrulatis; inflorescentia sessili, pauciflora, glabra; bracteis exterioribus e foliis gradatim reductis; bracteis florigeris oblongis, acutis, quam sepalis brevioribus, integris, tenuibus; pedicellis brevibus; sepalis liberis, linearibus, acutis, 14 mm longis, posterioribus carinatis; petalis aureis; staminibus inclusis; ovario supero.

TYPE: flowers yellow, bracts orange, pulvinate on dry exposed rock, near summit of Cerro Culebra at 1600 m alt., Cerro Duida, Amazonas, Venezuela, April 24, 1949, B. Maguire & B. Maguire, Jr. 29111.

The same species is represented by Maguire, Cowan, & Wurdack 29609, flowers orange-red, densely pulvinate on vertical cliffs, frequent, North Escarpment, at 1200 m alt., Cerro Duida.

17. *Navia saxicola* L. B. Smith, sp. nov. Fig. 41.

Humilis, verisimiliter pulvinata; parte brevi caulis solum cognita, foliis vetustis dense oblecta; foliis vivis plurimis, apice caulis rosulatis, juvenilibus pilis albis minutis dissite oblectis, mox glabris, vaginis parvis, suborbicularibus, basi hyalinis, apice atro-castaneis, laminis patentibus, linearibus, acuminatis, 8 cm longis, 3 mm latis, basi dense minuteque serrulatis, alibi laxius; scapo brevi, nudo; inflorescentia e centro foliorum parum exserta; bracteis exterioribus foliaceis sed valde reductis; bracteis florigeris ovatis, sepala superantibus, basi hyalinis, apice brunneis incrassatis et obscurissime serrulatis; pedicellis brevibus; sepalis liberis, oblongis, acutis, 6 mm longis, posterioribus, alato-carinatis, carina denticulata; petalis albis, stamina subaequantibus; antheris apice dehiscentibus; ovario supero.

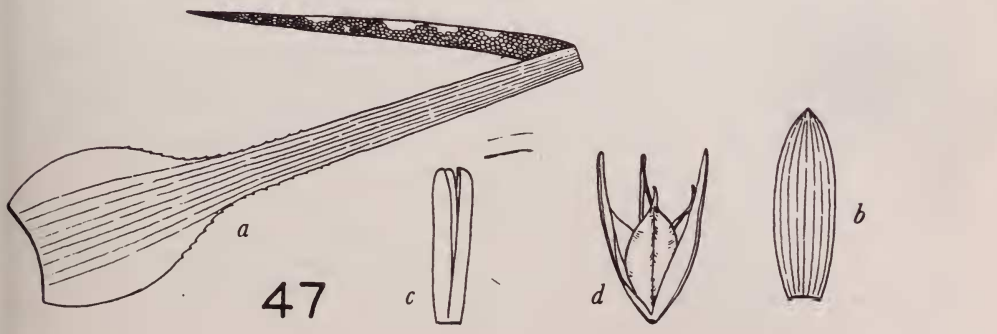
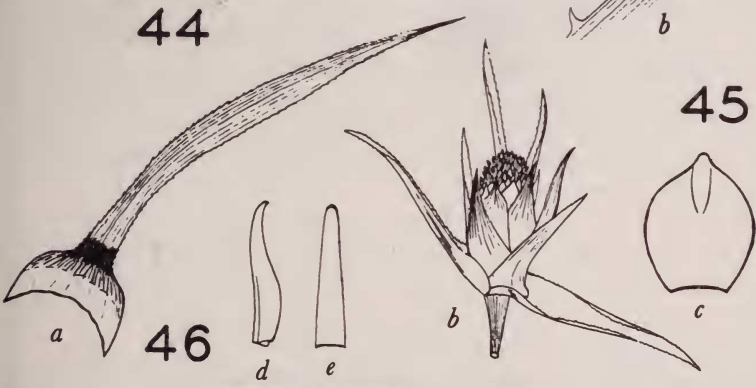
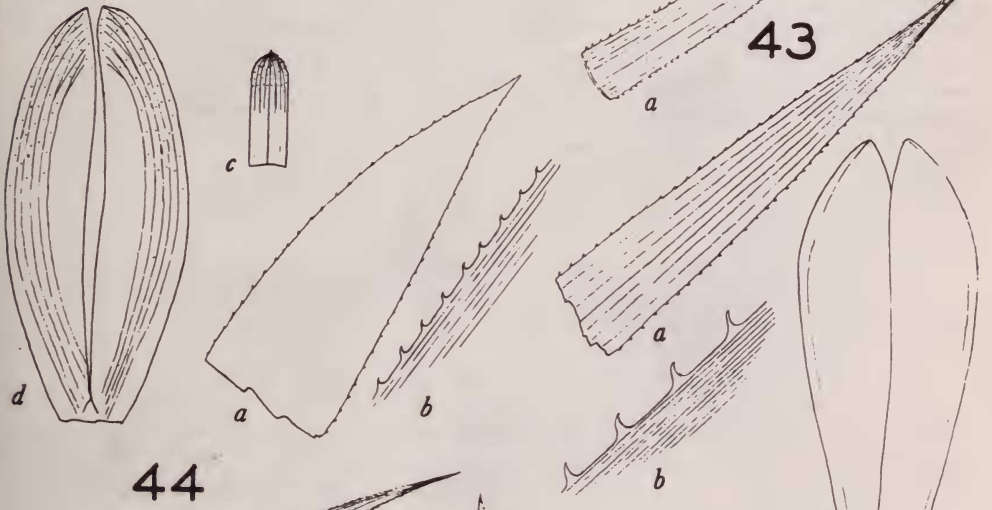
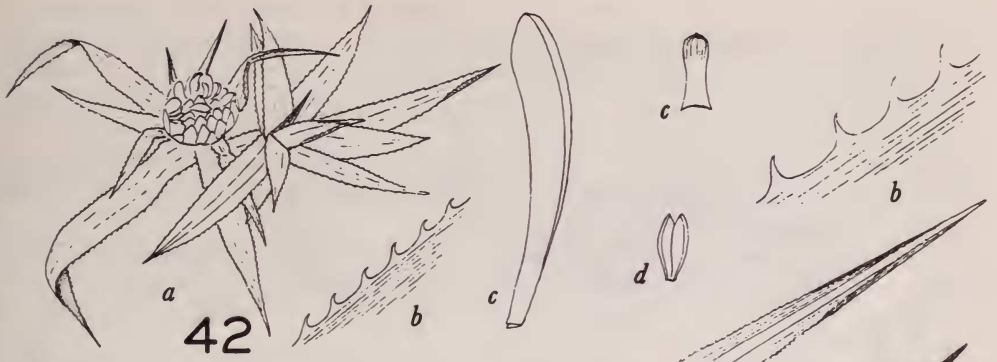
TYPE: flowers white, base of center (young) leaves white, frequent on rocks, cumbre at 1200 m alt., Cerro Yapacana, Río Orinoco, Amazonas, Venezuela, January 3, 1951, B. Maguire, R. S. Cowan & J. J. Wurdack 30680.

18. *Navia pauciflora* L. B. Smith, sp. nov. Fig. 42.

Humilis, forsan pulvinata; foliis ad 11 cm longis, vaginis parvis, quam laminis

Explanation of figures 42-47

FIGS. 42-47. *Navia*. FIG. 42. *N. pauciflora* (Maguire & Maguire 29154). a, habit,  $\times \frac{1}{2}$ ; b, margin of leaf,  $\times 5$ ; c, posterior sepal,  $\times 5$ . FIG. 43. *N. octopoides* (Maguire & Maguire 29151). a, apex of leaf,  $\times 1$ ; b, margin of leaf,  $\times 5$ ; c, floral bract,  $\times 1$ ; d, posterior sepals,  $\times 1$ . FIG. 44. *N. latifolia* (Maguire, Cowan & Wurdack 29642). a, apex of leaf,  $\times 1$ ; b, margin of leaf,  $\times 5$ ; c, floral bract,  $\times 1$ ; d, posterior sepals,  $\times 5$ . FIG. 45. *N. cretacea* (Maguire, Cowan & Wurdack 29682). a, apex of leaf,  $\times 1$ ; b, margin of leaf,  $\times 5$ ; c, posterior sepals,  $\times 5$ . FIG. 46. *N. cucullata* (Maguire 32766). a, leaf,  $\times 1$ ; b, inflorescence,  $\times 1$ ; c, floral bract,  $\times 2$ ; d, posterior sepal,  $\times 2$ ; e, anterior sepal,  $\times 2$ . FIG. 47. *N. umbratilis* (Maguire & Maguire 35406). a, leaf,  $\times 1$ ; b, floral bract,  $\times 2$ ; c, sepals,  $\times 2$ ; d, fruit,  $\times 2$ .



vix latioribus, brunneis, subglabris, laminis linearibus, acuminatis, pungentibus, 10 mm latis, serrulatis, supra glabris, subtus lepidibus cinereis adpressis omnino obtectis; inflorescentia sessili, pauciflora; bracteis exterioribus omnino foliaceis sed reductis; bracteis florigeris ellipticis, obtusis, sepala subaequantibus, integris, apice lepidotis; floribus subsessilibus; sepalis liberis, anguste spathulatis, late obtusis, 8 mm longis, 2 mm latis, posterioribus angustissime alato-carinatis, incurvatis; petalis staminibusque non visis; ovario supero; capsulis quam sepalis brevioribus; seminibus nudis.

TYPE: on banks and rocks, flowers white, common, Cerro Marahuaca, Amazonas, Venezuela, April 23, 1949, *B. Maguire & B. Maguire, Jr.* 29154.

19. *Navia octopoides* L. B. Smith, sp. nov. Fig. 43.

Humilis; foliis multis, ad 21 cm longis, vaginis brevibus, vix distinctis, laminis linearibus, acuminatis, 10 mm latis, subdense serrulatis, glabris, linea mediana lata pallida pictis; inflorescentia sessili, subglobosa, multiflora, 3 cm diametro; bracteis exterioribus omnino foliaceis sed reductis; bracteis florigeris panduratis, late rotundatis apiculatisque, sepala subaequantibus, tenuibus, nervatis, apice incrassatis lepidotis serrulatisque; pedicellis brevibus latisque; sepalis liberis, obovatis, late subacutis, incurvatis, 7 mm longis, 4 mm latis, posterioribus late alato-carinatis, incurvatis, carina lineari, acuminata; petalis staminibusque ignotis; ovario supero.

TYPE: terrestrial, flowers white, frequent in mixed forest near base of north slope, Cerro Duida, 3 miles south of Culebra, Amazonas, Venezuela, April 24, 1949, *B. Maguire & B. Maguire, Jr.* 29151.

20. *Navia latifolia* L. B. Smith, sp. nov. Fig. 44.

Humilis, habitum *N. cretaceae* imitans; foliis multis, 16 cm longis, vaginis parvis, brunneis, glabris, laminis oblongis, acutis vel acuminatis, 20 mm latis, dense serrulatis, supra glabris, subtus pulvere cretaceo niveo dense obtectis; inflorescentia sessili, hemisphaerica, 4 cm diametro; bracteis exterioribus foliaceis sed reductis; bracteis florigeris panduratis, late rotundatis apiculatisque, sepala subaequantibus, valde nervatis, apice serrulatis et lepidotis; pedicellis brevibus, latis; sepalis liberis, obovatis, 10 mm longis, valde nervatis, apice dissite lepidotis, posterioribus late alato-carinatis, incurvatis; petalis albis, laminis magnis; staminibus inclusis; ovario supero.

TYPE: leaves densely farinose below, flowers white, occasional in spray of upper falls, Caño Culebra at 1300 m alt., Cerro Duida, Río Cunucunuma, Amazonas, Venezuela, November 21, 1950, *B. Maguire, R. S. Cowan & J. J. Wurdack* 29642.

21. *Navia cretacea* L. B. Smith, sp. nov. Fig. 45.

Humilis; foliis multis, ca. 13 cm longis, vaginis brevibus, late ovatis, brunneis, laminis linearibus, acuminatis, 9-13 mm latis, subdense serrulatis, fere vel omnino concoloribus, supra glabris, subtus pulvere cretaceo niveo dense obtectis; inflorescentia sessili, hemisphaerica, 25 mm diametro; bracteis exterioribus foliaceis sed reductis; bracteis florigeris late oblongis, acutis, sepala subaequantibus, integris, laevibus, glabris; pedicellis brevibus, latis; sepalis liberis, obovatis, 12 mm longis, laevibus, glabris, posterioribus carinatis, incurvatis; petalis albis, laminis magnis; staminibus inclusis; ovario supero.

TYPE: flowers white, wet places on cliffs, diagonal ledge up south escarpment at 1400 m alt., Cerro Huachamacari, Río Cunucunuma, Amazonas, Venezuela, December 5, 1950, *B. Maguire, R. S. Cowan & J. J. Wurdack* 29882.

The species is also represented by number 30176 from the same mountain, flowers white, frequent on rocks, Right Fork Caño de Dios at 1800 m alt.



22. *Navia cucullata* L. B. Smith, sp. nov. Fig. 46.

Verisimiliter caulescens; foliis multis, apice caulis densissime aggregatis, ad 9 cm longis, axillis spinarum infimarum barbellatis exceptis glabris, foliis interioribus cum bracteis basi albis et aream coloratam magnam circa inflorescentiam formantibus, vaginis reniformibus, 15 mm latis, atro-brunneis, laminis linearibus, acuminatis, rigidis pungentibusque, 5-6 mm latis, basi paulo attenuatis, subtus valde nervatis, spinis minutis subdense serrulatis; scapo brevi, nudo; inflorescentia simplici, pauciflora, 8 mm diametro, glabra; bracteis exterioribus subfoliaceis sed valde reductis; bracteis florigeris ellipticis, obtusis, integris, apice incrassatis, quam sepalis brevioribus; sepalis liberis, sublinearibus, cucullatis, 9 mm longis, posterioribus basi anguste alato-carinatis; petalis albis (! Maguire); ovario supero.

TYPE: frequent on rocks near cumbre camp at 2000 m alt., Cerro Guaiquinima, Río Paragua, Bolívar, Venezuela, December 25, 1951, *B. Maguire* 32766.

The species is also represented by number 32824 from rocks in open savannas 1 km south of cumbre camp at 1800 m and by number 33098, a form with slightly broader leaves from a cliff face at waterfalls, North Valley, 1600-1700 m, both from the same region as the type.

23. *Navia umbratilis* L. B. Smith, sp. nov. Fig. 47.

Imperfecte solum cognita, verisimiliter caulescens; foliis multis, vaginis late ovatis, ca. 25 mm longis, pallide brunneis, margine late hyalinis, laminis linearibus, acuminatis, basi haud attenuatis, ad 16 cm longis, 5 mm latis, supra glabris, subtus dense adpresseque cinereo-lepidotis, anguste cartilagineo-marginata, basi laxe minuteque serrulata; inflorescentia nidulante, simplici, subglobosa, 1 cm diametro; bracteis exterioribus foliaceis sed reductis; bracteis florigeris ellipticis, late obtusis apiculatisque, sepala subaequantibus, integris, plus minusve cucullatis, tenuibus, cinereo-lepidotis; sepalis liberis, 12 mm longis, anguste lanceolatis, anteriore obtuso, posterioribus carinatis, valde cucullatis, tenuibus, glabris; petalis staminibusque ignotis; ovario supero; capsula ellipsoidea, 6 mm longa; seminibus nudis vel alis minimis deciduis praeditis.

TYPE: terrestrial herb, shade form with leaves more slender and without white bases, common near seepage at 200 m up left branch of Caño Yutaje at 1200 m alt., Serranía Yutaje, Río Manapiare, Amazonas, Venezuela, February 25, 1953, *B. & C. K. Maguire* 35406.

24. *Navia semiserrata* L. B. Smith, sp. nov. Fig. 48.

Humilis, pulvinata; caule ramoso, basibus foliorum vetustorum dense obtecto; foliis vivis multis, in apicibus caulis rosulatis, vaginis parvis, late ovatis, atro-castaneis, glabris, laminis linearibus, acuminatis, 6-7 cm longis, 3-4 mm latis, subtus adpresse albo-lepidotis, mox glabris, parte basali dense minuteque serrulata, parte apicali integra; scapo brevi, nuda; inflorescentia e centro foliorum exserta, globosa, 14 mm diametro; bracteis exterioribus foliaceis sed valde reductis; bracteis florigeris ovatis, sepala paulo superantibus, integris, tenuibus, apice abrupte acutis incrassatisque, dissite albo-lepidotis; pedicellis brevibus; sepalis liberis, lanceolatis, apice abrupte inflexis, 8 mm longis, glabris, posterioribus anguste alato-carinatis; petalis albis; staminibus inclusis; ovario supero.

TYPE: flowers white, frequent, dominant cumbre rock cover, cushions to 3 m diameter, Cerro Moriche at 1250 m alt., Río Ventuari, Amazonas, Venezuela, January 15, 1951, *B. Maguire, R. S. Cowan & J. J. Wurdack* 30959.

Number 30863 is the same species: flowers white, frequent on rocks, upper cliffs at 1000 m alt., Cerro Moriche.

25. *Navia mima* L. B. Smith, sp. nov. Fig. 49.

Humilis, habitum *N. brachyphyllae* valde imitans; caule simplici, erecto, robusto, 4-10 cm alto, foliis vetustis obtecto; foliis vivis apice caulis rosulatis, multus, 9-13 cm longis, vaginis brevibus, late ovatis, aterrimae castaneis, glabris, laminis linearibus, abrupte acutis vel obtusis, 5-7 mm latis, crasse coriaceis, dense minuteque serrulatis, supra glabris, subtus lepidibus cinereis adpressis omnino obtectis; inflorescentia sessili, pauciflora; bracteis exterioribus omnino foliaceis sed reductis; bracteis florigeris ellipticis, obtusis, quam sepalis paulo brevioribus, castaneis, apice incrassatis et dense cinereo-lepidotis; pedicellis brevibus; sepalis oblongis, obtusis, 15 mm longis, ad 6.5 mm connatis, tenuibus, castaneis, posterioribus carinatis; petalis staminibusque valde imperfecte cognitis; ovario supero.

TYPE: bracts white, leaves coriaceous, on exposed rocks and dry cliff ledges, frequent, Campo Grande, 1500 m alt., Cerro Sipapo, Terr. Amazonas, Venezuela, Dec. 11, 1948, *B. Maguire & L. Politi* 27590.

The species is also represented by number 28680 from the same region, East Basin summits, frequent at 2000 m alt.

26. *Navia pungens* L. B. Smith, sp. nov. Fig. 50.

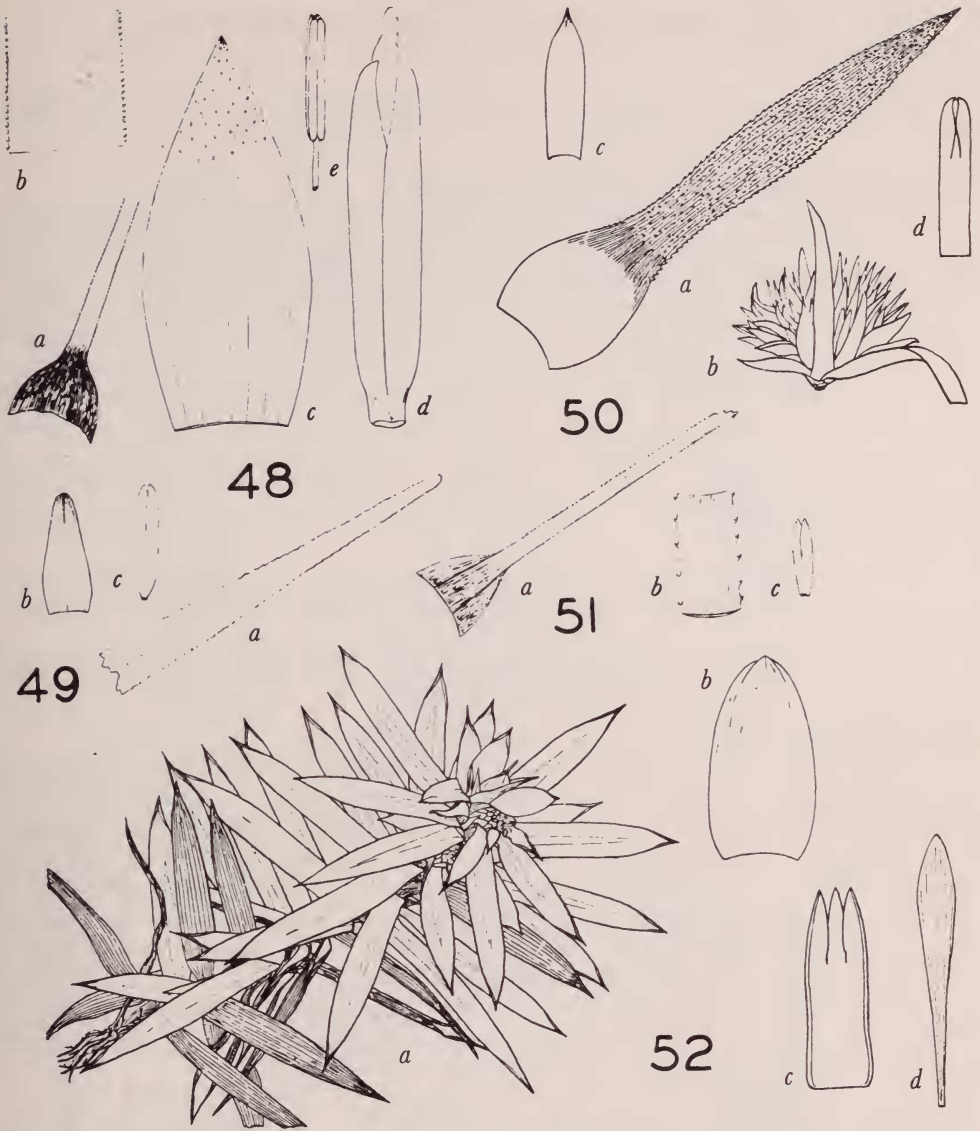
Simplex vel pulvinata; caule 1 cm diametro; foliis apicalibus solum cognitis, vaginis late ovatis, apice serrulatis et ex sicco brunneo-rubentibus, alibi integris pallidisque, laminis lineari-lanceolatis vel linearibus, acuminatis, basi paulo attenuatis albisque, 5-10 cm longis, 8-10 mm latis, angustissime cartilagineo-marginatis, subtus dense adpresseque cinereo-lepidotis, mox omnino glabris, laxe serrulatis; inflorescentia nidulante, subglobosa, 10-15 mm diametro; bracteis exterioribus foliaceis sed valde reductis; bracteis florigeris ellipticis, acuminatis, sepala subaequantibus, brunneis, paulo lepidotis, basi membranaceis, apice valde incrassatis pungentibusque; floribus subsessilibus; sepalis cochleari-imbricatis, oblongis, acutis, 11-14 mm longis, omnibus alte connatis, posterioribus anguste alato-carinatis, apice inflexis; petalis flavis; ovario supero; capsula ovoidea, acuta, 7 mm longa.

TYPE: cushion-former on rock face, leaf-bases white, common in deciduous woodland between Campo Verada and Campo M. Perez, Caño Verada at 900-1100 m alt., Cerro Guanay, Caño Guaviarito, Río Manapiare, Río Ventuari, Amazonas, Venezuela, January 30, 1951, *B. Maguire, K. D. Phelps, C. B. Hitchcock & G. Budowski* 31652.

VENEZUELA: Amazonas: solitary or forming cushions on rocks, common on summit at 1800 m alt., Cerro Guanay, Caño Guaviarito, Río Manapiare, Río Ventuari, February 4, 1951, *B. Maguire, K. D. Phelps, C. B. Hitchcock & G. Budowski* 31753. Common on rocks along left fork of Caño Yutaje at 1250 m alt., Cerro Yutaje, Serranía Yutaje, Río Manapiare, February 12, 1953, *B. & C. K. Maguire* 35215.

27. *Navia ocellata* L. B. Smith, sp. nov. Fig. 51.

Humilis; caule simplici, erecto vel ascendente, ultra 17 cm longo, foliis vetustis longe persistentibus densissime vestito; foliis vivis plurimis, apice caulis rosulatis, patentibus, foliis interioribus cum bracteis basi albis et aream coloratam circa inflorescentiam formantibus, vaginis late ovatis, parvis, atris, laminis linearibus, acuminatis, 12 cm longis, 1-2 mm latis, basi haud angustatis, laxe minuteque serrulatis, marginibus dissite lepidotis, mox glabris; inflorescentia sessili, ovoidea, 13 mm diametro, glabra; bracteis exterioribus e foliis gradatim reductis; bracteis florigeris ovatis, apiculatis, quam sepalis paulo brevioribus, tenuibus; pedicellis brevibus, latis; sepalis oblongis, acutis, 10 mm longis, alte connatis, tenuibus, glabris; petalis aureis; staminibus inclusis; ovario supero.



FIGS. 48-52. *Navia*. FIG. 48. *N. semiserrata* (Maguire, Cowan & Wurdack 30959). a, leaf,  $\times 1$ ; b, part of leaf-blade,  $\times 5$ ; c, floral bract,  $\times 5$ ; d, flower,  $\times 5$ ; e, anther,  $\times 5$ . FIG. 49. *N. mima* (Maguire & Politi 27590). a, apex of leaf,  $\times 1$ ; b, floral bract,  $\times 1$ ; c, posterior sepals,  $\times 1$ . FIG. 50. *N. pungens* (Maguire, Phelps, Hitchcock & Budowski 31652). a, leaf,  $\times 1$ ; b, inflorescence,  $\times 1$ ; c, floral bract,  $\times 2$ ; d, sepals,  $\times 2$ . FIG. 51. *N. ocellata* (Maguire & Politi 27500). a, base of leaf,  $\times 1$ ; b, part of leaf-blade,  $\times 5$ ; c, posterior sepals,  $\times 1$ . FIG. 52. *N. sandwithii* (Sandwith 1285). a, habit,  $\times \frac{1}{2}$ ; b, floral bract,  $\times 2$ ; c, sepals,  $\times 2$ ; d, petal  $\times 2$ .



TYPE: frequent, hanging on wet cliffs, lower North Escarpment at 1300 m alt., Cerro Sipapo (Paráque), Amazonas, Venezuela, Dec. 1-3, 1948, *B. Maguire & L. Politi 27500*.

The species is also represented by number 27866 from the same locality at 1400 m alt.

28. *Navia sandwithii* L. B. Smith, sp. nov. Fig. 52.

Caulescens; caule ad 28 cm longo, 4 mm diametro, foliis fere omnino occulto; foliis ad 14 cm longis, vaginis late ovatis, 1 cm longis, brunneis, glabris, laminis lineari-lanceolatis, acuminatis, basi attenuatis, 14-17 mm latis, anguste brunneo-marginatis, dense serrulatis, basi lepidoto-ciliatis, alibi glabris, pallide viridibus, ex sicco linea mediana albida pictis; inflorescentiis nidulantibus, terminalibus dein pseudolateralibus, simplicibus, paucifloris, 15 mm diametro; bracteis exterioribus foliaceis sed valde reductis; bracteis florigeris ovatis, obtusis apiculatisque, integris, tenuibus, glabris; sepalis oblongis, obtusis, 10-13 mm longis, alte connatis, posterioribus anguste alato-carinatis; petalis acutis, vix unguiculatis, 18 mm longis, albis, staminibus subaequantibus sed reflexis; ovario supero; capsula ellipsoidea, 5 mm longa; seminibus nudis, atris, verrucoso-sulcatis.

TYPE: on cliff face at the top of precipices and under boulders on precipices at 360 m alt., Kaieteur Falls, British Guiana, September 1-8, 1937, *N. Y. Sandwith 1285*, Kew.

BRITISH GUIANA: Dry rock shelf, 1 mile below Kaieteur Falls, Potaro River Gorge, May 13, 1944, *B. Maguire & D. B. Fanshawe 23435*.

29. *Navia subpetiolata* L. B. Smith, sp. nov. Fig. 53.

Caulescens; foliis subpetiolatis, ad 26 cm longis, apice obscure serrulato excepto integris, juvenilibus obscurissime dissiteque lepidotis, mox glabris, vaginis triangularibus, 3-4 cm longis, ex sicco rubentibus, laminis lineari-lanceolatis, acuminatis, 14 mm latis, marginibus paulo incrassatis; inflorescentia in centro foliorum sessili, ellipsoidea, 30 mm longa, 15 mm diametro, verisimiliter simplici; bracteis ellipticis, obtusis, ca. 2 cm longis, sepala superantibus, integris, laevibus, rubris; sepalis oblongis, obtusis, 16 mm longis, tenuibus, basi 4-5 mm connatis; staminibus inclusis; ovario supero.

TYPE: leaves basally white with extreme bases green, frequent in cumbre at 2000 m alt., Serranía Parú, Río Parú, Caño Asísa, Río Ventuari, Amazonas, Venezuela, February 10, 1951, *R. S. Cowan & J. J. Wurdack 31368*.

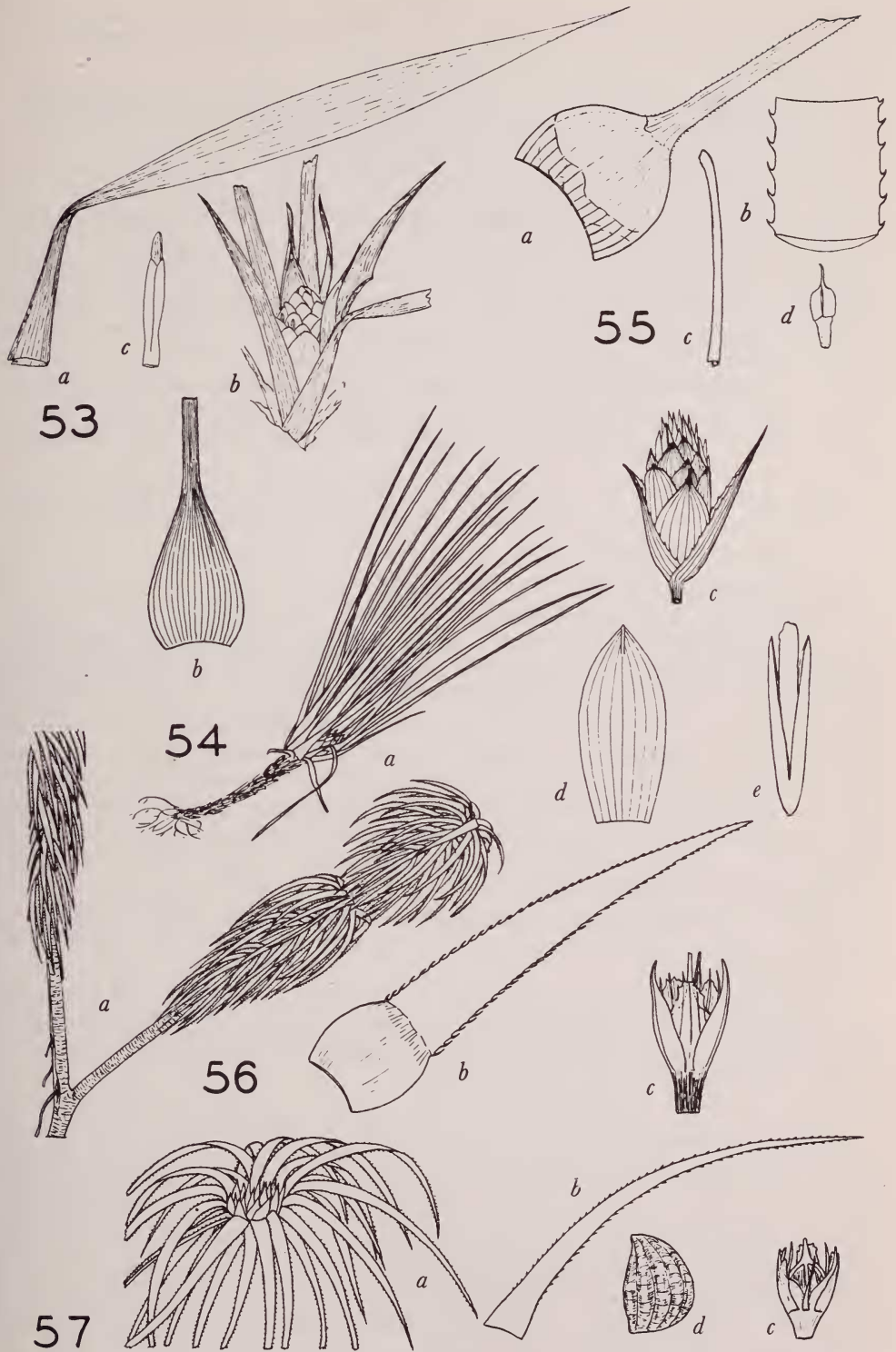
30. *Navia caricifolia* L. B. Smith, sp. nov. Fig. 54.

Caulescens; caule erecto, simplici, 10-19 cm alto, foliorum vaginis vetustis inclusis 1 cm diametro; foliis juvenilibus terminalibus, strictis, ad 22 mm longis, glabris, vaginis ovatis, 2 cm longis, nervatis, brunneis, laminis linearibus, acuminatis, ad 19 cm longis, 3 mm latis, basi obscure serrulatis, involutis, basi albis sed haud angustatis; inflorescentiis terminalibus et pseudolateralibus, sessilibus, simplicibus, anguste ellipsoideis, 23 mm longis, glabris; bracteis florige-

Explanation of figures 53-57

FIGS. 53-57. *Navia*. FIG. 53. *N. subpetiolata* (Cowan & Wurdack 31368). a, leaf,  $\times \frac{1}{2}$ ; b, inflorescence,  $\times \frac{1}{2}$ ; c, flower,  $\times 1$ . FIG. 54. *N. caricifolia* (Maguire & Maguire 35437). a, habit,  $\times \frac{1}{4}$ ; b, base of leaf,  $\times 1$ ; c, inflorescence,  $\times 1$ ; d, floral bract,  $\times 2$ ; e, posterior sepal,  $\times 2$ . FIG. 55. *N. immersa* (Maguire, Cowan & Wurdack 30325). a, base of leaf,  $\times 1$ ; b, part of leaf-blade,  $\times 5$ ; c, posterior sepal,  $\times 1$ ; d, pistil,  $\times 1$ . FIG. 56. *N. aloifolia* (Maguire, Wurdack & Bunting 37146). a, habit,  $\times \frac{1}{4}$ ; b, leaf,  $\times 1$ ; c, old flower,  $\times 2$ . FIG. 57. *N. parvula* (Maguire, Wurdack & Bunting 37326). a, habit,  $\times 1$ ; b, leaf,  $\times 1$ ; c, fruit,  $\times 2$ ; d, seed,  $\times 10$ .





ris ellipticis, sepala subaequantibus, integris, apice subulato-incrassatis, alibi tenuibus; sepalis linearibus, acutis, 12 mm longis, posterioribus connatis, anguste alato-carinatis; petalis albis; ovario supero.

TYPE: abundant on dry rocks at 1500 m alt., Cerro Coro-Coro, Serranía Yutaje, Río Manapiare, Amazonas, Venezuela, March 2, 1953, *B. & C. K. Maguire 35437*.

Number 35496 from the same locality is also this species.

### 31. *Navia immersa* L. B. Smith, sp. nov. Fig. 55.

Verisimiliter humilis; caule ignoto; foliis plurimis, fere 2 dm longis, vaginis suborbicularibus, 15 mm longis, subhyalinis, glabris, laminis linearibus, acuminatis, basi 3 mm latis, minutissime subdenseque uncinato-serrulatis, crassis, coriaceis, supra glabris, subtus adpresse albo-lepidotis; inflorescentia sessili, in centro foliorum immersa, verisimiliter simplici; bracteis exterioribus e foliis gradatim reductis; bracteis florigeris linearibus, acutis, tenuibus, serrulatis, apice incrassatis; pedicellis brevibus; sepalis liberis, linearibus, acutis, 30 mm longis, apice paulo dilatatis serrulatisque, tenuibus, glabris; petalis staminibusque ignotis; ovario 6 mm longo, robusto, parte infera sterili; seminibus paucis.

TYPE: frequent on South Escarpment face at 1400 m alt., Cerro Huachamacari, Río Cunucunuma, Amazonas, Venezuela, December 18, 1950, *B. Maguire, R. S. Cowan & J. J. Wurdack 30325*.

### 32. *Navia aloifolia* L. B. Smith, sp. nov. Fig. 56.

Caulescens, saepe decumbens; caule simplici vel pauciramoso, 3-15 dm longo, ca. 7 mm diametro, in partibus apicalibus ad 3 dm longis foliis densissime vestito, alibi denudato; foliis, juvenilibus dissite arachnoideis, vaginis erectis, late ovatis, 1 cm longis, ex sicco albis, laminis recurvatis, anguste triangularibus, acuminatis, 6 cm longis, 9 mm latis, rigidis, pungentibus, utrinque viridibus, margine spinis gracilibus atris antrorsis 1.5 mm longis subdense armatis; scapo nullo; inflorescentiis sessilibus, celerrime ramis auctis sympodialiter superatis pseudo-axillaribus, dense globosis, paucifloris; bracteis florigeris subfoliaceis, flores superantibus; floribus subsessilibus; sepalis cochleari-imbricatis, acutis, 9 mm longis, posterioribus anguste alato-carinatis; petalis aureis; ovario plus quam  $\frac{1}{3}$  infero; seminibus nudis.

TYPE: common near Cumbre Camp, summit at 1700 m alt., Cerro de la Neblina, Río Yarua, Amazonas, Venezuela, January 10, 1954, *B. Maguire, J. J. Wurdack & G. S. Bunting 37146*.

Further numbers of this species from Cerro de Neblina are: 37020, frequent along west escarpment edge; 37098, abundant along escarpment west of Cumbre Camp; 37170, dominant plant of open areas 4-8 km north of Cumbre Camp; and 37288, forming cushions on west escarpment edge northwest of Cumbre Camp.

### 33. *Navia parvula* L. B. Smith, sp. nov. Fig. 57.

Pulvinata; caule brevi sed ramoso, 5 mm diametro; foliis multis, 2-5 cm longis, lepidibus linearibus albis dissite vestitis, mox glabris, vaginis late triangularibus, 7 mm longis, laminis recurvatis, linearibus, acuminatis, basi haud attenuatis, 3-4 mm latis, laxe serrulatis; inflorescentia nidulante, pauciflora, 7 mm diametro; bracteis exterioribus foliaceis sed reductis; bracteis florigeris e late ovato acuminatis, sepala superantibus, apice serrulatis; floribus subsessilibus; sepalis liberis, triangularibus, acutis, 7 mm longis; petalis staminibusque ignotis; ovario  $\frac{1}{2}$  infero; capsula subglobosa, rostro excepto 4 mm longa; seminibus paucis, nudis, nigris, tuberculato-sulcatis.

TYPE: locally frequent in colonies on dry rock outcrops on south side of Cumbre Camp caño toward Caño Grande at 1500-1700 m alt., Cerro de la Neblina, Río

Yatua, Amazonas, Venezuela, January 16, 1954, *B. Maguire, J. J. Wurdack & G. S. Bunting 37326.*

***Vriesia sulcata* L. B. Smith, sp. nov. Fig. 58.**

Verisimiliter acaulis, florifera 6 dm alta; foliis 28 cm longis, vaginis late ellipticis sed quam laminis vix latioribus, 6 cm longis, lepidibus centro brunneis dense indutis, laminis anguste subtriangularibus, acuminatis, 3 cm latis, utrinque obscureque brunneo-punctulatis; scapo leviter curvato, 8 mm diametro; scapi bracteis strictis, dense imbricatis, infimis subfoliaceis, supremis ellipticis, apiculatis; inflorescentia simplicissima, 16-flora, oblonga, 20 cm longa, 5 cm lata, valde complanata; rhachi geniculata, excavata, dissite atro-punctulata; bracteis florigeris suberectis, internodiis subtriplo superantibus sed rhachin haud obtegentibus, ovatis, acutis, ad 5 cm longis, sepala bene superantibus, ecarinatis, ex sicco subchartaceis sulcatisque, obscure dissiteque atro-punctulatis; floribus per anthesin haud secunde versis; pedicellis crasse obconicis, 5 mm longis, sepalis lanceolatis, obtusis, 30 mm longis, 10 mm latis, ecarinatis, subchartaceis, dense brunneo-lepidotis; petalis ca. 4 cm longis, albis, basi ligulis binis acutis auctis.

TYPE: frequent on rocks in stream bed, right fork of Caño Yutaje at 1500 m alt., Cerro Yutaje, Serrania Yutaje, Río Manapiare, Amazonas, Venezuela, February 21, 1953, *B. & C. K. Maguire 35374.*

Apparently *Vriesia sulcata* is most nearly related to *V. chrysostachys* E. Morr., but its much larger bracts and flowers and its exposed geniculate rhachis make the differences much more obvious than the similarities. Since the type and only specimen is at anthesis, there is also the possibility of relation to some species where the flowers become secunde later, such as *V. vexillata* L. B. Smith. This latter, however, has a lax inflorescence and sepals that exceed the floral bracts.

***Vriesia fibrosa* L. B. Smith, sp. nov. Fig. 59.**

Florifera 5-6 dm alta; foliis multis, rosulatis, 3 dm longis, valde sulcato-nervatis et per aetatem in fibras longas atras persistentes divisus, utrinque lepidibus adpressas brunneas late scarioso-marginatas praeditis, vaginis ovatis, vix distinctis, laminis angustissime triangularibus, acuminatis, ca. 15 mm latis; scapo erecto, 5 mm diametro, glabro; scapi bracteis erectis, ellipticis, infimis angustissime laminatis, supremis quam internodiis brevioribus; inflorescentia laxe 6-7-flora, glabra; rhachi gracili, flexuosa; bracteis florigeris cum floribus secunde versis, late ovatis, obtusis apiculatisque, quam sepalis subduplo brevioribus, ecarinatis, tenuibus, nervatis; pedicellis 7 mm longis; floribus ante anthesin erectis dein secundo-patentibus; sepalis anguste ellipticis, obtusis, 25 mm longis, ecarinatis, ex sicco chartaceis, nervatis; petalis stamina superantibus, basi ligulis binis acutis auctis, laminis ellipticis, obtusis, 10 mm longis, extus rubescens, intus albo-virescens.

TYPE: terrestrial, frequent along open banks of Lower Caño Negro, 1400 m alt., Cerro Sipapo (Paráque), Amazonas, Venezuela, December 25, 1948, *B. Maguire & L. Politi 27912.*

Number 28108 collected in the same locality a few days later is the same species. It is noted as frequent on rocks in stream bed.

This species appears closely allied to *V. socialis* L. B. Smith, its floral bracts and sepals being almost identical in shape and texture although much smaller. Its scape and rhachis are more slender and a greater proportion of the scape-bracts exceed the internodes than in *V. socialis*. The most striking difference is in the leaves, judging from additional material of *V. socialis*, which has a broad, ligulate leaf-blade.



**Guzmania nubicola** L. B. Smith, sp. nov. Fig. 60.

Verisimiliter acaulis, florifera ca. metralis; foliis ad 64 cm longis, vaginis late ellipticis, dense brunneo-lepidotis, laminis ligulatis, acutis, 7 cm latis, pallido-lepidotis, supra glabratibus; scapo fere recto, 15 mm diametro, glabro; scapi bracteis erectis, dense imbricatis et scapo omnino obtegentibus, supremis exceptis foliaceis maximisque; inflorescentia dense bipinnatim paniculata, subcylindrica, 32 cm longa; axi recto; bracteis primariis viridibus, concoloribus, infimis e suborbiculari late triangularibus, spicis superantibus supremis apiculatis, quam spicis brevioribus; spicis subsessilibus, dense globosis, 4 cm diametro, ca. 10-floris; bracteis florigeris latissime ellipticis, 15-20 mm longis, membranaceis, haud sulcatis, lepidotis; pedicellis robustis, 5 mm longis; sepalis lanceolatis, 19 mm longis, ad 4.5 mm connatis, per anthesin paulo exsertis, sulcatis, lepidotis; petalis aureis.

TYPE: inflorescence heads covered with gelatinous mucilage, buds greenish yellow, flowers yellow, on upper escarpment slopes east of Camp 3 at 1700 m alt., slope forest, Cerro de la Neblina, Río Yatua, Amazonas, Venezuela, December 24, 1953, B. Maguire, J. J. Wurdack & G. S. Bunting 36852.

From its nearest relative, *Guzmania mitis* L. B. Smith, this species is distinguished by its larger dimensions throughout, its ampler, thinner, even floral bracts, and narrower sepals.

**Aechmea campanulata** L. B. Smith, sp. nov. Fig. 61.

Terrestris, acaulis, stolonibus gracilibus procreans; foliis paucis, anguste rosulatis, exterioribus valde reductis, interioribus ad 37 cm longis, inflorescentiam fere aequantibus, dissite minuteque albo-lepidotis, vaginis ellipticis, magnis, laminis ligulatis, late acutis apiculatisque, basi contractis, ad 43 mm latis, laxe minuteque serratis; scapo leviter curvato, gracillimo, glabro; scapi bracteis erectis, anguste lanceolatis, membranaceis, glabris, rubris, supremis internodia superantibus; inflorescentia paupere bipinnata, laxissima, petalis inclusis 9 cm longa, glaberrima; bracteis primariis eis scapi similibus, quam ramis paulo brevioribus; ramis divergentibus, 1-2-floris, floribus inclusis ad 65 mm longis; bracteis florigeris minutis, quam pedicellis multo brevioribus, membranaceis, rubris; pedicellis gracilibus, 4-6 cm longis, ex sicco sulcatis; floribus albis (! Maguire); calyce campanulato, sepalis liberis, valde asymmetricis, oblique lateque obovatis, 13 mm longis, inermibus, submembranaceis; petalis 26 mm longis, alte callis binis auctis, laminis ellipticis; staminibus inclusis, filamentis serie secundae alte cum petalis connatis, pollinis granulis globosis, poris non visis; ovario crasse obconico, tubo epigyno brevi sed distincto, placentis apice loculorum affixis, ovulis caudatis.

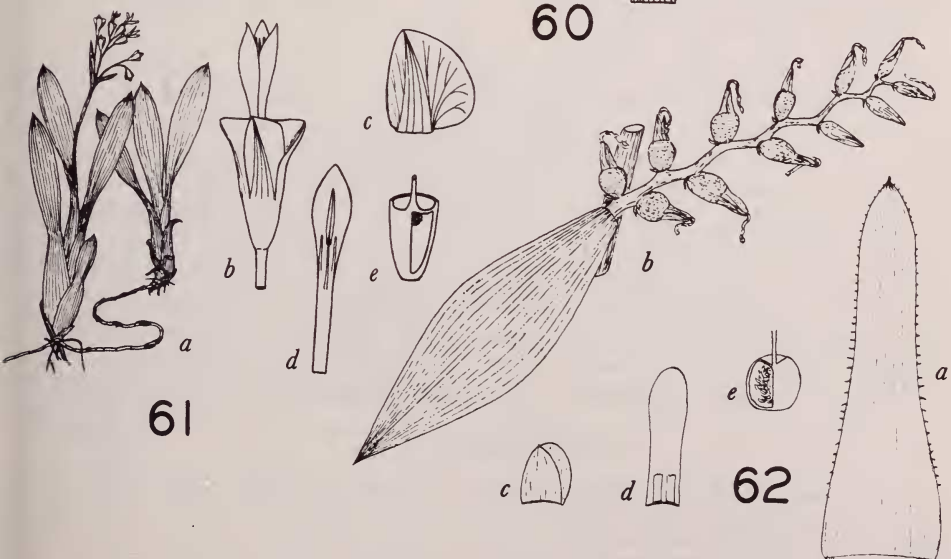
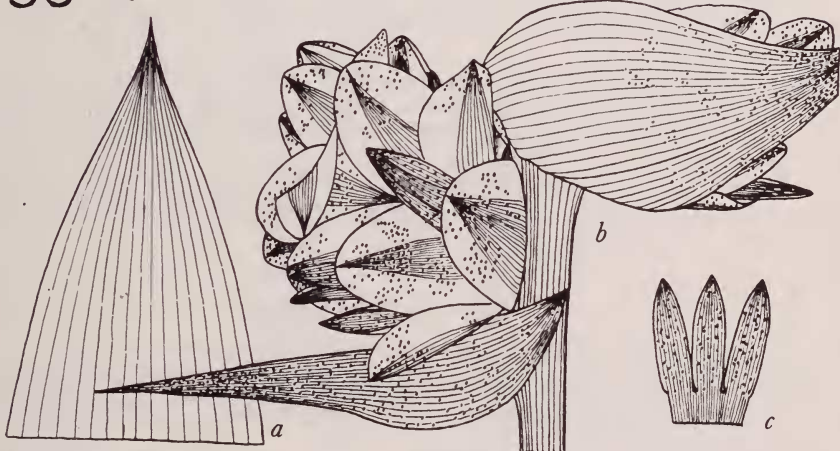
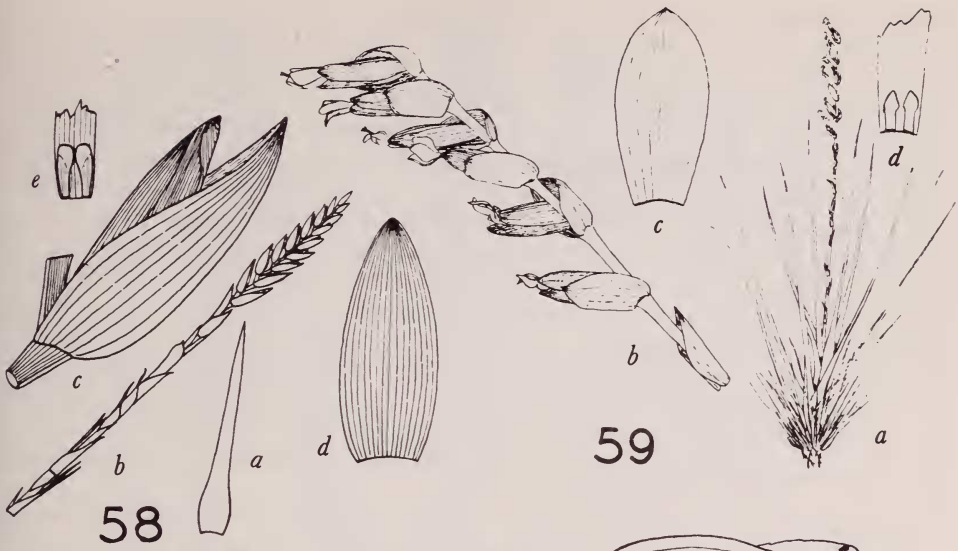
TYPE: summit of Eagle Mountain at 700 m alt. (mile 114.5, Bartica-Potaro Road), Valley of the Mahdia River (Tributary Potaro River), Pakaraima Mountains, British Guiana, October 13, 1951, B. Maguire 32098.

This species would appear to belong to the subgenus *Lamprococcus*, in which it is immediately distinguishable by its campanulate calices.

## Explanation of figure 58-62

FIGS. 58, 59, *Vriesia*. FIG. 58. *V. sulcata* (Maguire & Maguire 35374). a, leaf,  $\times \frac{1}{10}$ ; b, scape and inflorescence,  $\times \frac{1}{10}$ ; c, part of inflorescence,  $\times 1$ ; d, sepal,  $\times 1$ ; e, base of petal,  $\times 1$ . FIG. 59. *V. fibrosa* (Maguire & Politi 27912). a, habit,  $\times \frac{1}{10}$ ; b, inflorescence,  $\times \frac{1}{2}$ ; c, sepal,  $\times 1$ ; d, base of petal,  $\times 1$ . FIG. 60. *Guzmania nubicola* (Maguire, Wurdack & Bunting 36852). a, apex of leaf,  $\times 1$ ; b, section of inflorescence,  $\times 1$ ; c, sepals,  $\times 1$ . FIGS. 61, 62. *Aechmea*. FIG. 61. *Ae. campanulata* (Maguire 32098). a, habit,  $\times \frac{1}{10}$ ; b, flower,  $\times 1$ ; c, sepal,  $\times 1$ ; d, petal,  $\times 1$ ; e, ovary,  $\times 1$ . FIG. 62. *Ae. politii* (Maguire & Politi 27373). a, leaf,  $\times \frac{1}{10}$ ; b, part of inflorescence,  $\times \frac{1}{2}$ ; c, sepal,  $\times 1$ ; d, petal,  $\times 1$ ; e, ovary,  $\times 1$ .





**Aechmea politii** L. B. Smith, sp. nov. Fig. 62.

Florifera ultra 7 dm alta; foliis 7-10 dm longis, utrinque lepidibus adpressis pallidis vestitis, vaginis ellipticis, amplis, 25-30 cm longis, laminis ligulatis, late acutis vel rotundatis et cuspidato-apiculatis, 8-9 cm latis, planis, spinis latis planis ad 7 mm longis laxe armatis; scapo erecto, 7 mm diametro, albo-flocculoso, mox glabro; scapi bracteis erectis, ellipticis, acutis, quam intemediis multo brevioribus, integris, ex sicco chartaceis, rubris, albo-lepidotis; inflorescentia laxe bipinnatim paniculata, 3 dm longa, bracteis primariis exceptis mox glabra; bracteis primariis infimis eis scapi similibus sed majoribus, ad 11 cm. longis, deflexis, alteris valde abrupteque reductis, eis florigeris similibus; spicis divergentibus vel patentibus, basi brevissima nuda inclusa ad 8 cm longis, laxe 8-12-flora, rhachi gracili, geniculata; bracteis florigeris suborbicularibus, apiculatis, planis, minimis; floribus sessilibus, divergentibus; sepalis asymmetricis, ovatis, obtusis, brevissime mucronatis, 7 mm longis; petalis 15 mm longis, basi ligulis binis dentatis auctis; staminibus inclusis; ovario ellipsoideo, 5 mm longo, tubo epigyno brevi sed distincto, placentis centralibus, ovulis caudatis; bacca ex ovario valde incrassato.

TYPE: epiphyte, open rain forest, vicinity of Base Camp, 150 m alt., Cerro Sipapo (Paráque), Amazonas, Venezuela, November 24, 1948, B. Maguire & L. Politi 27373.

Number 28784 and its green phase, number 28785, have had their inflorescences nearly ruined by some accident but there is enough left to indicate that they are this species. They are noted as terrestrial, frequent in mixed forest, Intermediate Camp at 650 m alt., Cerro Sipapo.

By its large broad coarsely toothed leaves *Aechmea politii* is quickly distinguished from the nearly related *Ae. schultesiana* Mez, and by its remote entire scape-bracts from *Ae. nivea* L. B. Smith.

## HAEMADORACEAE

**Pyrrorrhiza** Maguire & Wurdack, gen nov. (Fig. 63.)

Orbis exterioris stamina staminodiaque nulla. Orbis interioris staminum unicum staminodia duabus linearia. Stylus punctiformis; ovarium glabrum liberum; ovula pro loculo dua.

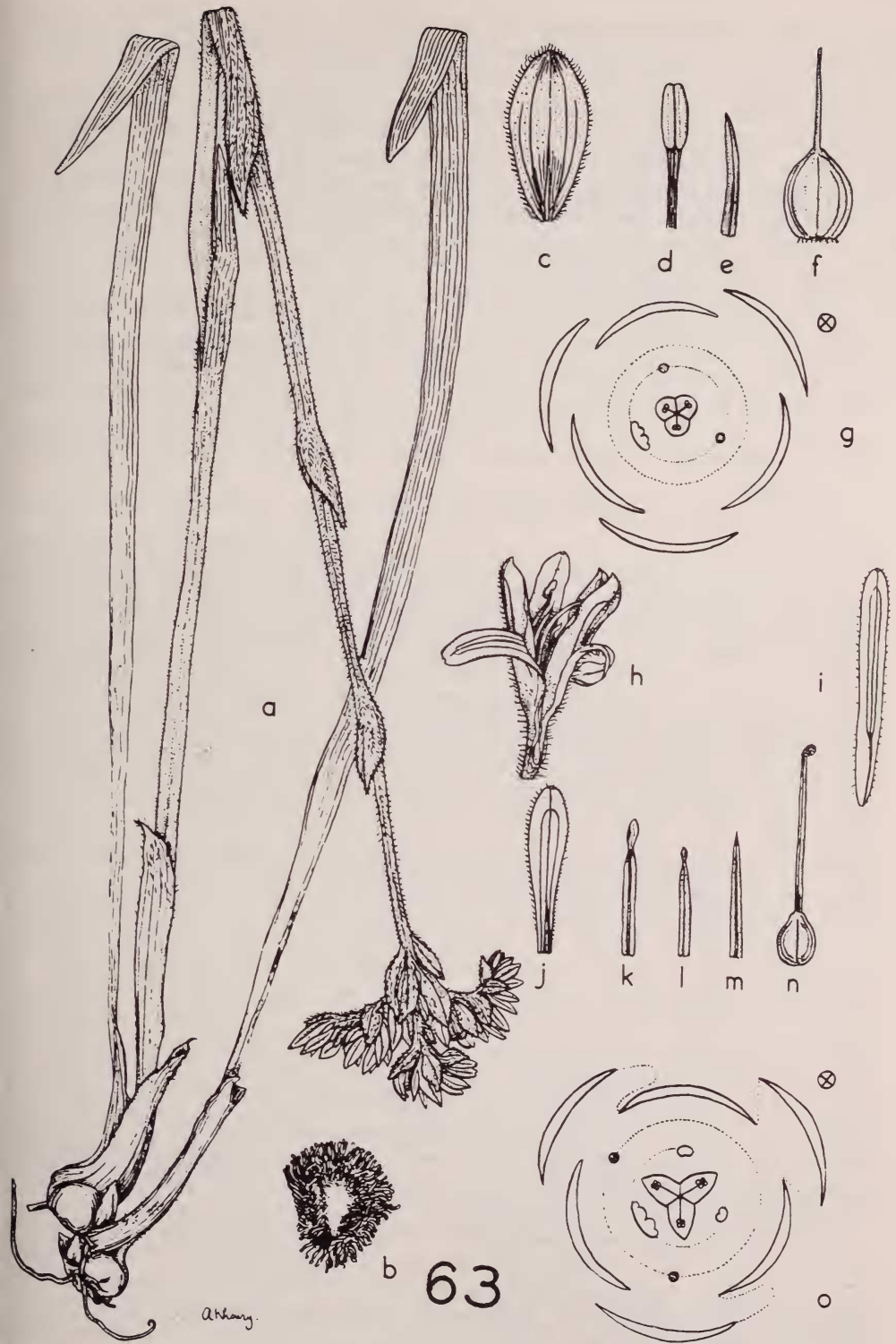
TYPUS: *Pyrrorrhiza neblinae*.

**Pyrrorrhiza neblinae** Maguire & Wurdack, sp. nov.

Herba cormifera unifoliata. Folium oblineare 30-36 × 0.8-1 cm carnosum glabrum, parte basali vaginante expansa 1-2 cm longa. Inflorescentia uniscaposa scapo basi bractea membranacea 3-5 cm longa vaginante bracteis superioribus 4 plusminusve coriacea vel carnosae 2-10 × 0.4-1 cm cum scapo crispo-pubescentibus setis subtilibus glanduliferis apicem versus densis. Inflorescentia plano-superata ramis helicoideis cum bracteolis dense glanduloso-villosis. Flores sessili vel breviter (ad 3 mm) pedicellati bracteolo unico suffulto, tepalis aequalibus 12.5-15 × 5.5-6 mm ellipticis obtusis vel late acutis trinerviis intus glabris extus modice vel sparse glanduloso-puberulis praecipue praeter medium, flore ceteroqui glabro. Stamina unici filamentum 3.5-4 mm longum crassum, anthera 3 × 1.1 mm biloculare longitudine dehiscente; staminodia linearia 1.7-2.7 × 0.2

## Explanation of figure 63

FIG. 63. a-g. *Pyrrorrhiza neblinae* Maguire & Wurdack: a. habit, × 1/4; b. immature seed, × 2; c. tepal, × 1; d. fertile stamen, × 1 1/2; e. staminode, × 5; f. pistil, × 1 1/2; g. floral diagram. h-o *Schiekea orinocensis* (H.B.K.) Meissn.: h. flower, × 1 1/2; i-j. tepals, × 3; k. large stamen, × 1 1/2; l. small stamen, × 2 1/2; m. staminode, × 1 1/2; n. pistil, × 2 1/2; o. floral diagram.



mm. Stylus 4.4–4.7 mm longus. Capsula 1.2–1.5 cm longa loculicida. Semen immaturum  $3 \times 2.5$  mm complanatum marginibus processis corneis rubris ca. 1 mm longis dense vestitis.

HOLOTYPE: Herb with bright red-orange rootstalk, scape apically brown-orange, perianth basally orange-red and apically white, locally frequent in open savanna of west headland 5 km southwest of cumbre camp, Cerro de la Neblina, Terr. Amazonas, Venezuela, elev. 1900 m, Jan. 6, 1954, *Maguire, Wurdack, & Bunting* 37108 (NY). Paratype: Rootstalk and inflorescence orange-red, perianth white basally orange, fruit orange-brown, occasional in savanna along west escarpment 1–3 km north of cumbre camp, Cerro de la Neblina, elev. 1800 m, Jan. 10, 1954, *Maguire, Wurdack, & Bunting* 37222.

The closest relative of *Pyrrohiza* seems to be *Schiekia*, which differs in having much smaller flowers with a definitely zygomorphic perianth, one large and two small stamens in the inner cycle, two staminodia in the outer cycle, four (3–5 according to Pax) ovules per locule, a capitate stigma, and smooth seeds.

*Schiekia orinocensis* (H.B.K.) Meissn. subsp. *savannarum* Maguire & Wurdack, subsp. nov.

Debilis (ad 40 cm altis) foliis pedunculi reductis, foliis basalibus 3–6 mm latis.

HOLOTYPE: Fls cream-white, the upper three tepals with basal orange streak, occasional in Savanna No. 1, northwest base of Cerro Yapacana, Terr. Amazonas, Venezuela, elev. 150 m, Dec 31, 1950, *Maguire, Cowan, & Wurdack* 30496 (NY). Paratypes: Same locality, Nov. 20, 1953, *Maguire, Wurdack, & Bunting* 36618; Savanna No. 3, northwest base of Cerro Yapacana, elev. 150 m, Dec. 31, 1950, *Maguire, Cowan, & Wurdack* 30471; Sabana de Moyo on south bank of Río Ventuari 15 km above mouth, Terr. Amazonas, Venezuela, elev. 150 m, May 5, 1954, *J. S. Level* 37. BRITISH GUIANA: Sand Creek, Rupununi River, Sept., 1948, *Wilson-Browne* 160; Kwaimatta, Rupununi River, Oct. 1888, *Jenman* 5164 and idem, Oct. 1889, *Jenman* 5728. Brazil: Río Caracarahy, Río Branco, Amazonas, 21–IX–1943, *Ducke* 1320.

Subsp. *orinocensis* has leaves 9–25 mm wide; the scape leaves show much less reduction; and the plant generally is much more robust.

Dr. Lourteig kindly forwarded from Paris a life-size sketch of *Humboldt & Bonpland* 843 (*Wachendorfia orinocensis* H.B.K.), collected on Isla Pararuma, Río Orinoco, Estado Bolívar, Venezuela. Judging from this drawing, the type of the typical subspecies is rather intermediate between lax woodland forms and the savanna subspecies. However, it tends more toward the woodland collections. The following Terr. Amazonas, Venezuela, collections agree quite well with the Humboldt & Bonpland collection: *Maguire* 29268, from the Río Atabapo 15 km above San Fernando de Atabapo, Oct. 17, 1950, and *Steyermark* 58439, from rock outcrops below the mouth of the Río Sanariapo, Sept. 18, 1944. The Brazilian and British Guianan specimens cited under subsp. *savannarum* tend somewhat toward the typical subspecies; a more extreme tending is shown by *Tate* 20 from Frechal, vicinity of Mt. Roraima, Sept. 6, 1927.

The woodland form with quite broad leaves is shown in such collections as *Spruce* 2111 from San Gabriel da Cachoeira, Rio Negro, Brazil and the following Terr. Amazonas, Venezuela, specimens: *Maguire & Wurdack* 34551 from the woodland between Savanna No. 3 and the gold mine camp, northwest base of Cerro Yapacana, elev. 150 m, Mar. 17, 1953, and *Maguire, Wurdack, & Bunting* 37678 from scrub forest on Laja Pamoni, Río Casiquiare at mouth of Caño Pamoni, elev. 130 m, Feb. 12, 1954. Only two marked ecotypes seem involved in the



species; unfortunately, the type specimen of the typical subspecies represents a slight aberration of the typical woodland form. Our field notes would indicate a difference in flower color between the extreme forms, the savanna subspecies having tepals basically white with orange stripes and the extreme woodland collections having solid orange tepals.

*S. flavescens* Maury (*S. congesta* Maury) was described and figured as having four staminodia and one anthered stamen. Unfortunately the type of this species could not be located at Paris. It may well be the same as *S. orinocensis* subsp. *savannarum*.

The flower structure of *S. orinocensis* needs clarification. Two of the outer tepals are united unilaterally to two of the inner adaxial tepals by flanges extending down the floral axis. In all collections examined, the outer whorl of stamens is represented by two linear staminodia; the inner whorl has one large (abaxial) stamen and two smaller-anthered (adaxial) stamens. In no case were fertile stamens observed in the outer whorl, although Pax (in E. & P. Nat. Pflanzenf. ed. 2. 15a: 390. 1930) implied occasional outer fertile stamens. The anthers of smaller inner stamens are somewhat caducous.

#### PIPERACEAE<sup>8</sup>

*Piper fanshawei* Yuncker, sp. nov.

Suffrutex glaber; foliis oblongo-ellipticis, apice acuminatis, basi inaequaliter acutis, fere totis vel quartum superum pinnatim venosis, nerviis utrinque 5 vel 6 sub margine laqueatis, petiolo a medio deorsum vaginato; bracteis lunato-truncatis dorso fimbriatis, drupa obovoidea apice puberula, stigmatibus parvis sessilibus.

Small, glabrous, nodose subshrub, 2 m tall, the upper internodes slender, 2-4 cm long. Leaves oblong-elliptic, acuminate, the base inequilateral, acute, one side about 2 mm shorter at the petiole, 3-4.5 cm wide and 10-14 cm long, pinnately nerved to the upper one-fourth or throughout, the nerves about 5 or 6 on each side, submarginally loop-connected, drying rather thin, translucent, very narrowly revolute, finely pellucid dotted, the petiole about 1 cm long, or occasionally to 2 cm, vaginate-winged below the middle. Spikes 4 mm thick and 2 cm long, apiculate, the peduncle 10-15 mm long, the bracts lunate-truncate, dorsally fringed, the fruits crowded, obovoid, velvety at the truncate-depressed apex, the stigmas small, sessile.

TYPE: BRITISH GUIANA: Pakaraima Mountains, Membaru-Kurupung Trail, occasional in *Cunuria* forest, alt. 1000 m, Oct. 29 - Nov. 4, 1951, *Bassett Maguire & D. B. Fanshawe* 32356 (NY).

The glabrous twigs and leaves, type of venation, and especially the strongly velvety fruits distinguish this species. In leaf shape and size, this species bears some resemblance to *P. suratanum* Trel. & Yun. of Colombia but it differs strongly in its velvety rather than glabrous fruits and with the petioles scarcely vaginate to the middle. It resembles *P. riitosense* Trel. & Yun. from Aragua, Venezuela, in the size of the spikes. That species, however, has obpyramidal-trigonus glabrous fruits and longer leaves with 8-10 branches from each side of the midrib.

*Piper striatifolium* Yuncker, sp. nov.

Frutex [?], internodiis superis perconferte luteo-villosis; foliis anguste oblongo-ellipticis, apice attenuatis longe acuminatis, basim versus angustatis

<sup>8</sup>By T. G. Yuncker.

obtusis subcordulatisve a lamina media pinnatim venosis, nerviis utrinque 3 vel 4 subtus proeminentibus supra valde sulcatis, supra glabris subtus villosis, petiolo brevi conferte villosa ad basim vaginato; drupa truncato-obovoidea subtragona glabra, stigmatibus sessilibus.

Shrub [?]; twigs slender, nodose, the upper internodes 1-2 cm long, very densely yellow-villous, the hairs up to 1mm or more long. Leaves narrowly oblong-elliptic or lance-oblong, with attenuately long-acuminate apex, the acumen 10-15 mm long, narrowing to the rounded, obtuse, or slightly cordulate base, one side 1-2 mm longer at the petiole, 2.5-3.5 cm wide and 14-16 cm long, pinnately nerved from the lower half, the nerves 3 or 4 on each side, strongly salient beneath and deeply impressed above, nearly straight and sub-parallel, with slender cross-connecting nervules, glabrous above, villous beneath, the nerves rather densely so, drying firm, opaque, revolute, the petiole scarcely 5 mm long, densely villous, vaginate at the base. Spikes 3 mm thick and 5-6 cm long, the peduncle about 1 cm long, villous, the bracts rounded-subpeltate, fringed, the drupe truncate-obovoid, subtetragonous, glabrous, glandular, the stigmas sessile.

TYPE: BRAZIL: Upper Rio Negro River, *Weiss & Schmidt* in 1907-08 (NY).

The densely villous stems, narrow leaves with impressed-salient nervation and comparatively short, stout spikes characterize this species. The impressed-salient nerves somewhat resemble those of *P. lineatum* R. & P. of Peru and Ecuador, but this species differs in the size and shape of its non-scabrid leaves and the character of the indument. In the shape of the leaves and the type of venation it resembles *P. jaboncillanum* Trel. & Yun. of Colombia. It differs, however, in its pubescence, fewer nerves, and shorter, straight spikes.

*Piper politii* Yuncker, sp. nov.

Frutex diffusus vel scandens, internodiis superis glabris vel juvenilibus plus minusve hispidis; foliis lanceolato-ovatis ad late ovata, apice acuminatis, basi rotundatis obtusis cordulatis vel cordatis, fere totis vel tertium superum pinnatim venosis nerviis utrinque 3-5 sub margine laqueatis, supra glabris subtus glabris vel ad venas plus minusve hispidis; petiolo ad basim vaginato; spicis adhuc immaturis, bracteis rotundato-subpeltatis margine conferte luteo-fimbriatis.

A nodose, trailing or scandent shrub, climbing to 15 m or more, the upper internodes comparatively short, glabrous to moderately or strongly hispid in young growth. Leaves lance-ovate to broadly ovate, the apex acuminate, the base equilateral or one side about 1 mm shorter at the petiole, rounded, obtuse, cordulate, or cordate, 2.5-4.5 cm wide and 5.5-8 cm long, pinnately nerved to the upper third or nearly throughout, the midrib prominent beneath, the lateral nerves 3-5 on each side, rather slender, submarginally loop-connected and with cross-connecting-anastomosing nervules, glabrous and glossy above, glabrous to sparingly or sometimes rather strongly hispid beneath along the nerves, drying coriaceous, opaque, revolute, the petiole mostly 5-10 mm long, glabrous to moderately hispid, vaginate at the base. Spikes as yet immature, as represented about 2.5 cm long, the peduncle 5 mm long, the bracts round-subpeltate, densely yellow-fringed.

TYPE: VENEZUELA: Bolívar: Cerro Guaiquinima, Río Paragua, locally frequent in dense "moss" woodland in deep narrow quebrada, "North" Valley, alt. 1600-1700 m, Jan. 4, 1952, *Bassett Maguire* 32968 (NY).

VENEZUELA: Amazonas: Cerro Sipapo (Paráque), on mixed forest slopes above lower escarpment above Caño Grande, alt. 1500 m, Jan. 21, 1949, *Bassett Maguire & Louis Politi* 28516 (NY). Bolívar: Chimantá Massif, Torono-tepuí, climbing attached to bluff base in sun, locally frequent, north-west-facing forested slopes between Summit Camp and base of escarpment, alt. 1880-1970 m, Feb. 27, 1955, stem dull green; lvs.

subcoriaceous, dull green above, paler dull green below, peduncle dull green; spikes ascending, greenish white, 4-6 mm diam., *Julian A. Steyermark & John J. Wurdack 1197* (F, NY); climbing on tree trunk, summit, along Caño Mojado, between base of upper falls and drop to escarpment, alt. 1895-1910 m, Feb. 23, 1955, lvs. chartaceous, dark green above, pale dull green below with impressed darker green veins, spikes erect, greenish white, 2.5 mm diam., *Julian A. Steyermark & John J. Wurdack 1071* (F, NY).

The trailing or scandent habit of growth, leaf shape, type of indument, etc. characterize this species. There is no evidence that the ovaries or drupes would be stylose. The immature spikes make it impossible to determine with certainty its relationship with other species. It resembles *P. hostmannianum* (Miq.) C.DC. to a slight extent but differs in its smaller leaves, shorter [?] spikes, and type of indument.

***Peperomia cladara* Yuncker, sp. nov.**

Herba carnosa stolonifera diffusa rupicola, ramis dissite hirsuta in sicco valde anguloso-sulcatis flavida desquamata ad nodos constricta. Foliis alternis vel raro oppositis pro more elliptico-suborbicularis apice rotundatis emarginatis basi obtusis palmatim 3-nerviis supra glabris subtus modice hirsutis, pilis erectis, petiolo crasso; spicis sat dissite florigeris, drupa aureo-flavida globosa rostrata, stigmatibus apicalibus.

A succulent, wide-spreading, rupicolous herb. Stem 2-3 mm thick, the branches ascending to 10-15 cm from the prostrate basal part, rooting at the lower nodes, drying yellow, scaly-exfoliating, strongly longitudinally grooved, deeply constricted and easily broken at the nodes, sparingly hirsute, the hairs erect, the internodes 5-10 mm long above to 3 cm below. Leaves alternate or infrequently opposite, elliptic, subobovate or mostly elliptical-suborbicular, the apex rounded, emarginate, the base obtuse, to 1.2-2 cm wide and 1.8-2 cm long, but often smaller. palmately 3-nerved, the midrib conspicuous, the lateral nerves more obscure, glabrous above, moderately hirsute beneath, the hairs erect, the apical notch usually somewhat bristly-hairy, drying coriaceous, wrinkled, revolute, glandular-pitted beneath, the petiole about 2 mm long, stout, constricted at the base, sparingly hirsute glabrescent. Spikes rather loosely flowered, 1-2 mm thick and 7-10 cm long, the peduncle rather slender, glabrous, 1-2 cm long, the bracts round-peltate, the drupes golden yellow, globose, beaked, about 1 mm long, with apical stigma.

TYPE: VENEZUELA: Bolívar: Cerro Guaiquinima, Río Paragua, occasional on moist rocks and cliffs near waterfalls, "North" Valley, alt. 1600-1700 m, Jan. 10-12, 1952, *Bassett Maguire 33047* (NY).

VENEZUELA: Bolívar: woodland floor at stream side, "North" Valley, alt. 1600-1700 m, Jan. 10-12, 1952, *Bassett Maguire 33072A* (NY). Amazonas: Caño Guaviarito, Río Manapiare, Río Ventuari, on rocks at summit of Cerro Guanay, alt. 1800 m, Feb. 4, 1951, *Bassett Maguire, Kathleen D. Phelps, Charles B. Hitchcock & Gerald Budowski 31748* (NY); Serranía Yutaje, Río Manapiare, Cerro, Coro-Coro, frequent on rocks, Mar. 2, 1953, *Bassett Maguire & Celia K. Maguire 35454* (NY); Cerro Yutaje, frequent on Northwest Ridge, Cerro Yutaje, alt. 1400 m, Feb. 11, 1953, *Bassett Maguire & Celia K. Maguire 35166* (NY).

***P. cladara* f. *perglabra* Yuncker, f. nov.**

A speciei forma typica differt planta omnino glabra.

Plants entirely glabrous.

TYPE: VENEZUELA: Amazonas: Cerro Sipapo (Paráque), on rocks in north branch of Caño Profundo, frequent, alt. 1600 m, Jan. 8, 1949, *Bassett Maguire & Louis Politi 28253* (NY).

VENEZUELA: Amazonas: Serranía Yutaje, Río Manapiare, frequent on northwest ridge of Caño Yutaje, alt. 1500 m, Mar. 1, 1953, *Bassett Maguire & Celia K. Maguire 35421* (NY).



***P. cladara* f. *ciliata* Yuncker, f. nov.**

A speciei forma typica differt foliis ciliolatis.

Leaves bristly ciliolate, but otherwise glabrous.

TYPE: VENEZUELA: Amazonas: Cerro Huachamacari, Río Cunucunuma, infrequent on cliff face in dense valley woodland between Summit Camp and savanna on "East" Ridge, alt. 1800 m, Dec. 8, 1950, *Bassett Maguire, R. S. Cowan & John J. Wurdack* 30041 (NY).

The constricted stems render the dry specimens very brittle and easily broken. The leaf shape and arrangement, and easily fragmented stems are distinctive characters of this species. It belongs in the subgenus *Micropiper* which includes only a small number of alternate-leaved species. *P. purpurinervis* C. DC. from Mt. Roraima, also a *Micropiper* with alternate leaves, differs in its leaf shape, minutely puberulent parts, and shorter spikes.

***Peperomia celiae* Yuncker, sp. nov.**

Herba carnosae diffusa; caule glabro vel juvenili dissite crispo-pubescenti; foliis alternis rotundato-ovatis, apice obtusis vel subacutis, basi rotundatis cordulatis subpeltatis, conferte ciliolatis palmatim 5-7 nerviis, petiolo leviter pubescenti; spicis terminalibus atque (?) axillaribus, pedunculo glabro, drupa oblongo-cylindrica apice obliquo-scutelliformi, stigmati centrali.

A succulent, spreading herb. Stem glabrous, or slightly crisp-pubescent when very young, 2-3 mm thick when dry, drying glossy and with exfoliating epidermis, the internodes mostly 1-3 cm long. Leaves alternate, round-ovate, with rounded, obtuse, or acutish apex, the base rounded, cordulate, slightly peltate, variable in size, 1.5-3.5 cm wide and 1.5-4 cm long, glabrous above, sparsely crisp-pubescent glabrescent beneath, strongly finely ciliate throughout, the ciliation extending onto the petiole as two hairy lines, palmately 5- or faintly 7-nerved, the innermost pair of lateral nerves approximating the midrib in the lowermost 2-3 mm, the midrib and main lateral nerves finely branched upward and submarginally loop-connected, drying firm, glossy, dark, translucent, the petiole 5-10 or sometimes 20 cm long, sparingly crisp-pubescent. Spikes terminal and (?) axillary, about 2 mm thick and 10-12 cm long, the peduncle to 1 cm long, glabrous, the bracts round-peltate, the drupe oblong-cylindrical, thickening slightly toward the truncate base, about 2 mm long, with obliquely scutelliform apex and central stigma.

TYPE: VENEZUELA: Amazonas: Serranía Yutaje, Río Manapiare, rare on northwest ridge of Caño Yutaje, alt. 1500 m, Mar. 1, 1953, *Bassett Maguire & Celia K. Maguire* 35422 (NY).

This species belongs in the group of species (*Rhynchophorum*) having fruit with a scutelliform apex. It differs from all known species in its broadly ovate, cordulate, densely ciliated leaves. It is named for Celia K. Maguire, one of the collectors of the type specimen.

***Peperomia gracilipeduncula* Yuncker, sp. nov.**

Herba epiphytica sat parva glabra; foliis alternis ellipticis vel elliptico-oblongatis, apice abrupte acuminatis, basi cuneatis, septuplinerviis apice ciliolatis; petiolo canaliculato decurrenti-amplexanti; spicis terminalibus axillaribusque, ovario apicè obliquo truncato, stigmati subapicali, drupa immatura.

A comparatively small, glabrous, herbaceous epiphyte, the stems 1.5 mm thick near the base when dry, ascending from a decumbent rooting base to about 10 cm high, the internodes to 1 cm long or occasionally 2 cm. ridged by the decurrent petiole margins. Leaves alternate, elliptic or elliptico-oblongate, the apex bluntly pointed, the base cuneate, 1.5-3.2 cm wide and 3.5-8 cm long, or some



lower leaves with scarcely pointed apex and smaller, septuplinerved, the outermost pair of lateral nerves very slender and inconspicuous, the innermost pair coalescing with the midrib within the lowermost 10 mm, with numerous slender, cross-connecting-anastomosing nervules as viewed by transmitted light, ciliolate about the apex, drying rather firm translucent, the petiole 5-8 mm long, canaliculate, clasping-decurrent. Spikes terminal and axillary, up to 6 cm long and 2 mm thick, moderately flowered, the peduncle slender, to 3 cm or more long, the bracts round-peltate, the ovary ovoid [?], the apex oblique, the stigma subapical, the drupe as yet immature.

TYPE: VENEZUELA: Yaracuy: Sierra de Aroa, June 7, 1953, *L. Aristeguieta & F. Pannier* 1958 (NY).

This species appears to be near *P. diruptorum* Trel. of Panama from which it differs in its much longer peduncles and larger, 7-plinerved leaves. In *P. diruptorum* the bracts on young spikes are very crowded and overlap shingle-like. In this species the bracts on spikes of comparable age scarcely are in contact and show no overlapping.

#### *Peperomia venusta* Yuncker, sp. nov.

Herba glabra; ramis caulis adscendentibus; foliis alternis lanceolato-ovatis 5-10 mm e margine peltatis, apice obtuse acutis, basi rotundatis palmatim 7-9-nerviis eciliatis; spicis terminalibus [?] axillaribusque, ovario obovoideo apice obliquo, stigmatibus subapicalibus, drupa haud matura.

A glabrous herb. Stem decumbent and rooting at the lower nodes, the branches ascending to 10 cm or more, 1-3 mm thick at the base when dry, the internodes about 2 cm long above, lengthening to 10 cm or more downward. Leaves alternate, lance-ovate, gradually narrowed to the blunt apex, peltate 5-10 mm above the rounded base, the lower leaves 3-4 cm wide and 7-8 cm long, much reduced upward, palmately 7-9-nerved, the nerves conspicuous beneath, obscurely branched upward, the innermost two pairs of lateral nerves gently curving and continuing to the apex, drying rather thin, translucent, glandular-dotted beneath, ciliation lacking, the petiole up to 8 cm long on lower leaves, scarcely 1 cm long on smaller upper leaves. Spikes terminal and [?] axillary, 2 mm thick and 2-4 cm long, the peduncle to 3 cm long, the bracts round-peltate, glandular-dotted, the ovary obovoid with oblique apex and subapical stigma, mature fruit not seen.

TYPE: VENEZUELA: Amazonas: Cerro Marahuaca, slope rainforest, alt. 1000 m, May 3, 1949, *Bassett Maguire & Bassett Maguire, Jr.* 29187A (NY).

The lance-ovate, bluntly pointed and round-based peltate leaves are distinctive of this attractive species. It apparently bears some resemblance to *P. schenkiana* Dahlst. of Santa Catharina but differs in its proportionately longer leaves with rounded rather than cordate base.

#### ANNONACEAE<sup>9</sup>

#### *Annona trunciflora* R.E.Fr., sp. nov.

Arbor ca. 7 m alta; ramuli novelli rubescentes, pilis ± adpressis rubro-ferugineis vestiti; internodia 1.5-2 cm longa. Petiolus 0.6-1 cm longus, supra canaliculatus; lamina rigide coriacea, exsiccata supra nigrescens et lucida, subtus olivacea, oblanceolato-obovata, basin versus cuneato-acutata et decurrens, apice breviter acutata et cuspidate 0.5-1 cm longa instructa, 8-12 cm longa et 3-4 cm lata; costa supra impressa, subtus valde prominens rugosa; nervi laterales I. utrinque 7-9, supra paulo impressi, subtus elevati, 2-3 mm intra marginem

<sup>9</sup>By R. E. Fries.

arcuato-conjuncti; reticulum venularum praecipue subtus impressum. Flores e trunco exeuntes; pedicelli recti, rigidi, ca. 3 cm longi et 2-3 mm crassi, apicem versus paulo incrassati, dense ferrugineo-tomentelli, prope basin articulati. Sepala in discum integrum 10-12 mm latum coalita, extus dense ferrugineo-tomentella, intus glabra. Petala exteriora valvata, crassa, rigida, ovata, acutiuscula, extus densissime sericea, intus breviter tomentella, 3-3.5 cm longa et 2-2.5 cm lata; petala interiora marginibus tenuibus imbricata, exterioribus  $\pm$  aequilonga, utroque latere breviter densissime cinereo-tomentella. Stamina numerosissima, filamento 1-1.5 mm longo incluso 4-4.5 mm longa; connectivi appendice truncato-semiglobosa minute papillosa; pollinis grana miniata. Ovaria numerosa, sub anthesi non coalita, linearia, ca. 3 mm longa, dense ferruginea-sericea, stigmatibus minuto acuto glabro. (Fructus ignotus.)

TYPE: VENEZUELA: Estado Bolívar, occasional in forest at Raudal Maraca (about 110 river km from mouth), Río Parguaza, elev. 115 m, Dec. 31, 1955, J. J. Wurdack & J. V. Monachino 41044. (NY).

Unfortunately the material of this species is incomplete, as fruits are missing. However the flower material is rich and it shows that the type belongs to the genus *Annona*. According to the revision of the sections of *Annona*, published by the author in *Acta Horti Bergiani* 10: 198 (1931) this new species must be placed in section *Eu-Annona*, even if the pocket-shaped pits in the nerve angles on the back side are very small. In the vegetative parts the new species agrees also rather much with the section *Psammogenia*, especially in the impressed network of the veins. However, the imbricate aestivation of the inner petals does not agree with the valvate inner petals of *Psammogenia*. The most remarkable character for the new species is the cauliflory, with the flowers situated on the stem.

*Duguetia venezuelana* R.E.Fr., sp. nov.

Frutex 9.3-1 m altus vel arbuscula ad 4 m alta; ramuli densissime aureo-lepidota. Petiolus 2-5 mm longus; lamina rigida, supra-ab initio omnino glabra et laevis, subtus lepidibus stellatis argenteis et margine tantum fimbriatis densissime vestita, ovalia, basi brevissime acuta, apice rotundata vel breviter acutata vel interdum minute emarginata, 4-6 cm longa et 2-3 cm lata; costa subtus elevata. Pedunculi breves (ca. 5 mm longi), bractea minuta instructi. Sepala fere libera, ovata, acutiuscula, extus densissime lepidota, intus pilis stellatis tomentella sed basin versus glabra, ca. 1.5 cm longa et 1-1.5 cm lata. Petala extus densissime stellato-lepidota, intus glabra sed apicem versus pilis stellatis tomentella, exteriora rhombeo-spathulata ca. 2.5 cm longa et 1.5 cm lata, interiora paulo angustiora, oblongo-spathulata, ad 3 cm longa et 1 cm lata. Stamina 1.5-2 mm longa, connectivi appendice globosa, brevissime setulosa. (Fructus ignotus.)

TYPE: VENEZUELA: Alto Río Orinoco, Territorio Amazonas; locally occasional in tree "islands" in Savanna No. 3, northwest base of Cerro Yapacana, elev. 150 m, Mar. 17, 1953, Bassett Maguire & John J. Wurdack 34565 (Herb. Mus. Holm.).

Because the inner petals are narrower than the outer, this species ought to be placed in section *Heteropetalum*. However, it recalls in its habit section *Eu-Duguetia* (*D. furfuracea* and others) and it would perhaps be better to refer it to that section. *D. venezuelana* is distinguished by the small, elliptic leaves, which are rounded at the apex and quite glabrous above from the first.

*Duguetia dimorphopetala* R.E.Fr., sp. nov.

Frutex 1 m altus, ramuli novelli dense stellato-lepidoti. Petiolus crassus, 3-8 mm longus; lamina rigida, discolor, supra ab initio glabra, subtus primo dense, demum laxe lepidibus margine fimbriatis vestita, ovato-oblonga, ca. ad

medium latissima, basi et apice breviter acuta, interdum cuspidate brevi obtusiuscula instructa, 8-12 cm longa et 2-4 cm lata; costa supra paulo impressa, subtus valde elevata; nervi laterales tenues, utrinque 12-18, angulo fere 90° exeuntes, ca. 2 mm intra marginem arcuatim conjuncti. Flores solitarii; pedicelli curvati, ca. 8 mm longi, prope basin bractea amplectente ca. 2 mm longa instructi. Sepala libera, membranacea, acuta, ovata, extus densissime stellato-lepidota, intus cinereo-tomentella et basin versus glabra, 1.5 cm longa et 1-1.2 cm lata. Petala extus densissime argenteo-lepidota, intus sursum pilis stellatis tomentosius ceterumque glabra, anteriora ovata obtusa ca. 3 cm longa et 1.2 cm lata, interiora conspicue angustiora, lineari-oblonga, acuta, 3 cm longa et 0.6 cm lata. Fructus globosus, ca. 2 cm diam.; carpodia basin versus glabra, apice pyramidata acuta et cinereo-lutescenti-tomentella.

TYPE: VENEZUELA: Rio Guainía, in sabanita 1 km east of Maroa, elev. 125 m, April, 16, 1953, *Bassett Maguire & John J. Wurdack* 35683 (NY).

The narrow inner petals place this species in section *Heteropetalum* R.E.Fr., where it is most closely related to *D. venezuelana*. From this it differs by the larger, basally acute leaves and by the narrower inner petals.

*Duguetia tenuis* R.E.Fr., sp. nov.

Arbor; ramuli tenues flexiles, juniores pilis stellatis patentibus instructi. Petiolus 1-2 mm longus; lamina membranacea, concolor, supra laevis et costa stellato-hirsuta glabrescenti excepta glaberrima, subtus primo pilis stellatis flavescens hirsuta, mox fere omnino glabra, lanceolata vel anguste obovata, ad medium vel paulo supra medium latissima, basin versus angustata, ima basi paulo inaequalateralis, uno latere acuto, altero plus minus obtuso, apice in cuspidem 1-1.5 cm longam et vulgo obtusam sat sensim contracta, (6-) 8-9 cm longa et 1.5-3 cm lata; costa supra impressa, subtus prominens; nervi laterales tenues, supra parum conspicui, subtus prominuli et reticulum laxum formantes. Sepala extus incano-tomentella, ovata, 15 mm longa et ca. 8 mm lata. Petala ca. 12 mm longa et 8 mm lata, exteriora ovata acuta, interiora oblonga. Stamina 2 mm longa, connectivi appendice conico-acuminata. Fructus (immaturus) 1 cm diam.; monocarpia glaberrima, in acumen longum subito contracta.

TYPE: BRITISH GUIANA: Issinoru Creek, Maz. R., in Morabuco forest on red lateritic soil, March 4, 1949, Forest Department Field No. F 2860 (Record No. 6007), (NY).

*Duguetia tenuis* belongs to section *Alcmene* and is closely related to *D. neglecta* Sandw. It differs from this by smaller and comparatively narrower leaves with less marked cusp and less rounded base. The flowers seem to be smaller but perhaps are not fully developed on the material available.

*Ephedranthus fragrans* R.E.Fr., sp. nov.

Arbor ca. 15 m alta; ramuli novelli glabri, vetustiores cinereo-corticati; internodia 1.5-2 cm longa. Petiolus 8-12 mm longus, glaber et nigrescens, sursum canaliculatus; lamina membranaceo-chartacea, ab initio glaberrima, elliptica, ad medium latissima, basi acuta et conspicue decurrens, apice in cuspidem obtusam ca. 1.5 cm longam contracta, 12-14 cm longa et 5-6 cm lata; costa utrinque elevata; nervi laterales angulo acuto exeuntes, sursum curvati; reticulum venularum densum, utrinque prominulum. Flores (masculi solum obvii) albi, fragrantés, ex axillis foliorum delapsorum exeuntes, solitarii vel pauci; pedicelli rigidi, 5-8 mm longi, ut sepala petalaeque brevissime cinereo-sericei, bracteis nunnulis (ca. 3) infra medium instructi. Sepala reniformia, 1.5-2 mm longa, 3 mm lata. Petala tenuia, ovato-oblonga, apice rotundata, 10-15 mm longa, interiora



paulo angustiora. Torus conicus, acutus, 2.5 mm altus. Stamina 2-2.5 mm longa. Carpella in floribus masculis desunt.

TYPE: VENEZUELA: Río Negro, occasional on lower slopes of Piedra Nunca (just north of Piedra Cucuy), elev. 100-150 m, Apr. 10, 1953, *Bassett Maguire & John J. Wurdack* 34954 (Herb. Mus. Holm.).

This new species belongs to section *Eu-Ephedranthus* R.E.Fr. though the hairs on the flowers are remarkably short. It is especially characterized by the quite glabrous young shoots and leaves and by the conical acute torus. Moreover the leaves are acute at the base and distinctly decurrent.

*Guatteria robusta* R.E.Fr., sp. nov.

Arbor ramulis novellis tomentosis pilis patentibus ferrugineis densissime vestitis. Folia fere sessilia; lamina rigida, discolor, supra obscure viridis, subtus ferruginea, utrinque densissime verruculosa, supra ab initio glaberrima, subtus pilis longis patentibus instructa, obovata, basin versus longe sensimque angustata, apice in cuspidem ca. 1 cm longam contracta, ca. 25 cm longa et 12 cm lata; costa supra valde impressa, subtus cylindrico-prominens; nervi laterales utrinque 20-25, validi, supra valde impressi, sub angulo fere 90° exeuntes, pulchre paralleli, ca. 4 mm intra marginem arcibus curvatis conjuncti. (Flores ignoti.) Monocarpia ellipsoidea, apice rotundata, basin versus in stipitem 4-5 mm longum subito contracta, exsiccata nigra, rugulosa, 13-16 mm longa et 9-10 mm diam. Semen nigrum, nitidum, striato-rugosum, hilum ca. 2 mm latum.

TYPE: BRAZIL: Amazonas: São Paulo de Olivenca, with fruits, Apr. 1945, *R. de Lemos Fróes* 20788 (NY).

Vernacular name: "Envira da mata."

This species belongs to section *Mecocarpus* and is most nearly related to *G. microcalyx* R.E.Fr. From this it differs by the patent hairs on the lower surface of the leaves, and by the very dense ferruginous indument on the young shoots and nerves. The short, elliptic monocarps are also characteristic of the species.

*Guatteria maguirei* R. E.Fr., sp. nov.

Frutex vel arbor 4-6 m alta, dense ramosa; ramuli novelli exsiccati nigricantes, pilis laxis instructi sed mox glabrescentes. Folia rigida, exsiccata olivacea, subtus paulo pallidiora; petiolus 2-4 mm longa, supra leviter canaliculata; lamina supra glaberrima et lucida, subtus pilis longis patulis nonnullis instructa, mox glabrescens, ovata, basi rotundata vel interdum brevissime acuta, apicem versus longe caudato-acutata, 4-8 cm longa et 1.5-3 cm lata; costa supra basin versus paulo impressa, subtus valde elevata; nervi laterales angulo ca. 80° exeuntes, reticulum densum formantes. Flores solitarii; pedicelli tenues, primo pilis pallidis sparsis patulis instructi, mox glabri, 10-17 mm longi, ca. 4 mm supra basin articulati, fructiferi ad 30-35 mm elongati. Sepalarotundaro-ovata, ca. 3 mm longa et lata, extus sericea. Petala oblonga, apice obtusiuscula marginibus vulgo reflexis extus basin versus ferrugineo-sericea. Monocarpia numerosa, ellipsoidea, basi et apice breviter acuta, glabra sed minute rugosa, castanea 8-9 mm longa et 4-6 mm lata, stipitibus 1.5-2 mm longis sustentata.

TYPE: GUIANA: Cerro Yutaje, Río Manapiare, Territorio Amazonas, occasional along left fork of Cano Yutaje, elev. 1250 m, Febr. 12, 1953, *Bassett Maguire & Celia K. Maguire* 35231, with fruits (Herb. Mus. Holm.).

VENEZUELA: Río Guainía, in Sabana El Venado on left bank of Caño Pimichín near Pimichín, elev. 140m, April 14, 1953, *Bassett Maguire & John J. Wurdack* 35657, with flowers.

This species belongs to section *Cephalocarpus* R.E.Fr. and is closely related to *Guatteria venezuelana* R.E.Fr. From this the new species differs in the shape



of the leaves, which are rounded at the base and more gradually narrowed towards the tip, and by the ellipsoidal, distinctly stipitate monocarps. It also lacks the dense ferruginous hairs which cover the young shoots and the leaves of *G. venezuelana*.

*Guatteria stenopetala* R.E.Fr., sp. nov.

Arbor ca. 8 m alta. Ramuli novelli pilis erecto-patentibus brevibus vestiti, mox glabrescentes et nigricantes. Petiolus 4-6 mm longus; lamina rigida, late ovata, basi rotundato-acuta et in petiolum brevissime decurrens, apice in cuspidem 5-10 mm longum obtusum contracta, 5-8 (-10) cm longa et 3-5 cm lata, utroque latere glabra; costa supra in foliis junioribus pilis brevibus patulis obsita, mox glabrescens, subtus rubescens et primo breviter sericea, demum glaberrima; reticulum venularum densum, utroque latere prominens. Flores in axillis foliorum solitarii; pedunculi graciles erecti, 3-3.5 cm longi, pilis brevibus ferrugineis adpressis vel paulo patulis vestiti, basi et ad medium bractea minuta instructi. Flores parvi. Sepala rotundato-ovata, acuta, extus ferrugineo-sericea, intus glabra, mox recurvata, ca. 3 mm longa. Petala erecta, omnia lineari-oblonga, obtusa, extus basin versus ferrugineo-sericea, apicem versus cinereo-tomentella, 7-8 mm longa et ca. 3 mm lata. Stamina 1 mm longa, disco connectivi plano breviter set conspicue setuloso. Pedunculus fructifer gracilis, rigidus, 3.5 cm longus. Monocarpia ovoidea, glabra et nitida, basi breviter acutata, apice rotundata et brevissime apiculata, ca. 10 mm longa et 5 mm diam., stipitibus 13-15 mm longis sustentata.

TYPE: VENEZUELA: Territorio de Amazonas; Cerro de la Neblina, Río Yatua, in *Clusia* "moss-forest" elev. 650 m, Dec. 29, 1953, *Bassett Maguire, John J. Wurdack & George S. Bunting* 36970 (NY).

This very characteristic species agrees most closely with *Guatteria trichostemon* R.E.Fr. in having upright flowers with long peduncles and oblong petals. This new species has markedly narrower petals of uniform width, tapering gradually upwards. The hairiness of its leaves is also somewhat reminiscent of *G. trichostemon* in that the median nerves are at first hairy on the upper sides of the leaves, but soon become glabrous. *G. trichostemon* is the only so far known species of the *Trichostemon* section in which the median nerves are persistently pilose on their upper sides. The difference between the two species compared here is most marked in the shape of their leaves, which in *G. stenopetala* is broadly oval, 4-5 cm broad, and in *G. trichostemon* oblong-lanceolate, 1.5-2 (-2.5) cm broad.

*Unonopsis rigida* R.E.Fr., sp. nov.

Frutex 5 m altus, Petiolus niger, crassus, glaber, supra planus, 2-3 mm longus; lamina rigide chartacea, utrinque glaberrima, haud verrucosa, elliptica vel elliptico-obovata, basin versus interdum paulo angustata, ima basi late rotundata non decurrens apice rotundata et abrupte cuspidata, (12-) 18-27 cm longa et 5-11 cm lata; costa utroque latere prominens, nervi laterales I. utrinque 14-15, arcuato-adscendentes, 4-6 mm intra marginem conjuncti; reticulum venularum supra planum et vix conspicuum, subtus paulo prominens. Inflorescentiae e ramulis efoliosis exeuntes; pedicelli florum ca. 2.5 cm longi, tenues, brevissime et laxiuscule rufo-sericei. Sepala semiorbicularia, ca. 1 mm longa. Petala 12-14 mm longa et 9-10 mm lata, exteriora sericea, interiora praeter partem inter exteriora expositam tomentellam glabra. Stamina 1.5 mm longa, connectivi appendice setulosa. Ovaria dense ferrugineo-hirsuta. (Fructus ignotus.)

TYPE: BRAZIL: Estado da Amazonas, Rio Negro, Porto Curucuhy, terreno arenoso, with flowers, Oct. 6, 1945, *Ricardo de Lemos Froes* 21110. (NY).

*Unonopsis rigida* is closely allied to *U. stipitata* Diels and like that species is characterized by large rigid leaves and by the occurrence of hairs on the connective shields. However, it differs conspicuously in the form of the leaves, which are rounded at the base, not cuneate, by very short and thick petioles, and by thinner and less hairy peduncles.

***Anaxagorea gigantophylla* R.E.Fr., sp. nov.**

Arbor ad 12 m alta, ramulis novellis crassis densissime breviterque ferrugineo-tomentosis; internodia ca. 4 cm longa. Petiolus crassus (7-10 mm diam.) sicut ramuli ferrugineo-tomentosus; lamina gigantea, 60-70 cm longa et 20-27 cm lata, rigide membranacea, exsiccata subtus olivacea et pilis stellatis minutis ferrugineis mox evanidis instructa, ovata, basi rotundata et ima basi obliqua, apicem versus sensim angustata et acuta vel ca. 2 cm longe cuspidata; costa supra impressa et glabra, subtus valde elevata, ad 4-5 mm crassa, dense ferrugineo-tomentosa, demum ± glabrescens; nervi laterales utrinque ca. 25, sursum arcuati et 2-4 mm intra marginem regulariter arcuatim conjuncti, supra impressi, subtus conspicue prominentes. Inflorescentiae vulgo biflorae in ramis efoliatis sitae; pedicelli crassi, ferrugineo-tomentosi, 1-1.5 cm longi, basi bractea minuta et infra calycem bractea altera vaginiformi-amplexententi majore parati. Alabastra subglobosa, obtusa, ca. 1.5 cm diam. Sepala basi breviter coalita, ovata, acuta, mox reflexa, 12-15 mm longa. Petala crassa, extus tomentella, oblonga, apice rotundata, 20 mm longa et 8-10 mm lata, interiora apicem versus intus carinata. Stamina numerosa, ca. 5 mm longa, appendice connectivi semiglobosa glabra; stamina interiora sterilia. Carpella ca. 4 mm longa. Monocarpia ca. 30 mm longa, rugosa, apice apiculo ca. 1 mm longo parata.

TYPE: VENEZUELA: Territorio de Amazonas: Cerro de la Neblina, Río Yatua, frequent in rainforest southeast of Base Camp, elev. 140 m, Dec. 14, 1953, Bassett Maguire, John J. Wurdack & George S. Bunting 36774 (NY).

VENEZUELA: Territorio de Amazonas: Ríos Pacimoni-Yatua, Casiquiare, in forest along uppermost Río Yatua, 100-140 m, Dec. 7-8, 1953, Bassett Maguire, John J. Wurdack & George S. Bunting 36713 (NY and Holm.).

The new species described here is of particular interest because of its very large leaves. Being from 60-70 cm long and about 25 cm broad, they are actually larger than those of any so far known member of the *Annonaceae*. *Polyalthia dolichophylla* and *Crematosperma novogranatense* also have large leaves, up to 50 cm long and in *Gutteria guianensis* leaves may be up to 60 cm long. *Anaxagorea gigantophylla* probably holds the long-leaf record in this family.

Systematically, this species is most closely related to *A. dolichocarpa*, with which it agrees in the presence of sterile stamens inside the fertile ones, and in having the same small stellate hairs on the under sides of its leaves. Its gigantic leaf dimensions, and the much more numerous lateral nerves impressed on their upper sides, however, distinguish this new species from *A. dolichocarpa*.

***Heteropetalum spruceanum* R.E.Fr. var. *longipetala* R.E.Fr., var. nov.**

A typo differt petalis exterioribus lineari-lanceolatis arcuatim recurvatis, 1.5-2 cm longis et ca. 9.5 cm latis.

TYPE: COLOMBIA: Río Atabapo, occasional along drowned river margin between San Fernando de Atabapo and Cacagual, 150 m elevation, 18 Nov., 1953, Bassett Maguire, John J. Wurdack & George S. Bunting 36261 (NY).

Vernacular name: "Majagua."

The genus *Heteropetalum* belongs to the North Brazilian flora; it is indigenous in the Rio Negro and Rio Casiquiare districts, but also occurs in the adjoining

parts of Venezuela and Colombia. The two species so far known—*H. brasiliense* and *H. spruceanum*—are very closely related, and it might possibly be more correct to unite them into one species. The genus is characterized by the greatly reduced size of its outer petals; these are strikingly smaller than those of the inner whorl, and in the species so far known very like the sepals. In *H. brasiliense* the sepals and outer petals are of equal size and short-pointed, but in *H. spruceanum* they are protracted into narrow tips. In our variety *longipetala*, which in respect of its vegetative parts is closely related to *H. spruceanum*, the outer petals—in the rest of the genus short and sepal-like—are nearly 2 cm long; the fact that they are directed outwards and arched backwards in a peculiar way is very striking.

The great reduction of the outer petals into sepal-like shapes which characterizes the genus *Heteropetalum*, has previously led some authors to attach the genus to the *Miliusa* group of the *Annonaceae*. In a paper published in 1942 (in *Arkiv för Botanik*) the present writer has, however, tried to show that this character is not particularly important from a systematic point of view, and that in other respects this genus fits well into the *Guatteria* section of the *Annonaceae* system. The fact that a type like the variety described here has been found to have long outer petals quite different from the sepals provides additional support for the opinion that the relationship of *Heteropetalum* to the *Miliusa* group is not very close.

#### DROSERACEAE

##### *Drosera* L.

Specimens of *Drosera* recently collected in Guayana include with few exceptions all species now known for Venezuela. The following key leads to the material at hand from Guayana and Venezuela.

##### Key to the Species of *Drosera*

1. Styles 3 or 5, not bipartite.
  2. Styles 3, ramiform-penicillate at the tips; stems branched-fastigiata; leaves with obvious petioles; scapes lacking; flowers solitary and short-pedicellate; seed 0.6–0.8 mm long, oblong, finely foveolate in 16–18 vertical lines; sect. *Meristocaulis*.
    1. *Drosera meristocaulis*
  2. Styles 5, ramiform-penicillate at the tips; leaves without obvious petioles; scapes 10–20 cm long, glabrous or sparingly glandular-pubescent; seed elliptic-ovoid, ca. 0.3 mm long, biapiculate, foveolate in 8–10 vertical lines; sect. *Thelocalyx*.
    2. *Drosera sessilifolia*
1. Styles 3, bipartite to the base; sect. *Drosera*.
  3. Scapes evidently or strongly pubescent or glandular-pubescent.
    4. Scapes stipitate-glandular.
      5. Leaves 2 cm or less long.
        6. Scapes 10–25 cm long, moderately or strongly stipitate-glandular, (5) 10–15-flowered; leaves strongly fuscous-strigose-pilose beneath; seed subclavate, 0.8–1.0 mm long, prominently bullate-papillate.
          3. *Drosera roraimae*
        6. Scapes 5–8 cm long.
          7. Scapes sparingly stipitate-glandular-pilose, mostly solitary, sometimes 2–3, 2–4-flowered; leaves glabrous beneath; sepals oblong-ovate, erose-denticulate, externally pilose; seed "obovoid, foveolate."
            4. *Drosera cayennensis*
          7. Scapes and inflorescence conspicuously pilose-stipitate-glandular, mostly 2–5, sometimes solitary, 2–4-flowered; sepals acutish; seed 0.3–0.4 mm long, subglobose, foveolate in vertical lines.
            5. *Drosera arenicola*



5. Leaves 8-12 cm long; seed ellipsoidal, ca. 0.75 mm long, scrobiculate-punctate. 6. *Drosera cendeensis*.
4. Scapes sparsely or moderately septate-villous, not glandular, 2-8 cm long, 2-5-flowered; petioles densely strigose-villous beneath; blades marginally strigose, otherwise glabrous beneath; seed ovoid-subglobose, (0.3) 0.4-0.5 mm long, apiculate, foveolate in 12-16 (18) vertical lines. 7. *Drosera kaieteurensis*.
3. Scapes glabrous or essentially so, or inconspicuously very sparingly glandular-puberulent.
8. Calyx 3-5 mm long.
9. Leaf-blades broadly spatulate or obovate; scapes 2-5, filiform, glabrous, 1-3 cm long, 2-3-flowered; sepals oblong, obtuse at the apex; seed 0.3-0.4 mm long, oblong-subglobose, finely foveolate. 8. *Drosera pusilla*.
9. Leaf-blades oblanceolate or narrowly spatulate; scapes neither capillary nor filiform.
10. Leaves 3-4 cm long, the petioles 3 to 4 times exceeding the blades; scapes 8-15 cm long; seed 0.7-0.9 mm long, oblong, densely and irregularly muricate-papillate. 9. *Drosera intermedia*.
10. Leaves 1-2 cm long; the petioles subequal or less than twice longer than the blades; scapes usually 2-3, angular-compressed, 10-25 cm long, subglabrous; calyx ca. 3 mm long, the sepals lanceolate-oblong, acute, externally sparsely glandular-puberulent; seed scrobiform-fusiform, reticulate. 10. *Drosera communis*.
8. Calyx 2.0-2.5 mm long.
11. Stipules adnate for 0.5-0.6 mm, dissected to the base in 5-6 acicular segments; scapes usually solitary, capillary; calyx minutely glandular-puberulent; seed shining black, 0.3-0.4 mm long, narrowly oblong-elliptic, biapiculate, foveolate in ca. 10 vertical rows. 11. *Drosera esmeraldae*.
11. Stipules free to the base or adnate for 0.1-0.3 mm, irregularly dissected into lanceolate segments for 2/3 their length; scapes more often 2-3, (ours) capillary; calyx glabrous; seed brownish, ca. 0.4 mm long, ellipsoid-subglobose, costulate-papillose in 14-16 vertical ridges. 12. *Drosera capillaris*.

### *Meristocaulis* Maguire & Wurdack, sect. nov.

Styli 3, integri ad apices ramiformi-penicillati; caulibus paucifurcatis; stipulis conspicuis; scapis defectis; floribus solitariis, brevipedicellatis; seminibus oblongis foveolatis. Monotypica.

TYPE species: *Drosera meristocaulis* Maguire & Wurdack.

*Meristos* (μεριστός); divided; *caulos* (καυλός), stem.

#### 1. *Drosera meristocaulis* Maguire & Wurdack, sp. nov.

Caules 5-15 cm longi ad apices pauciramosi, fastigiati, foliis demum marcescentibus; foliis confertis ascendentibus, demum abrupte reflexis; stipulis scariosis adnatis ad basis, 2-carinatis 8-10 mm longis, 3-partitis, segmentis fimbriate laceratis; petiolis glabris, 6-8 mm longis teretibus aliquantum sursum compressis; lamina anguste oblanceolatis 4-5 cm longis, 8-12 mm latis, subtus glabris; escaposa; floribus solitariis vel aliquando 2-3, axillaribus, subterminalibus; pedicellis 3-4 mm longis, glabris, cum una sola angusta bracteola 2-4 mm longa; sepalis 5, elliptico-oblongis 4-5 mm longis, 1.5 mm latis, obtusiusculis externe exigue albo-pustulatis; hypanthio ca. 1 mm longo; petalis oblanceolatis, ca. 10 mm longis; staminibus 5; filamentis planis fragilibus ca. 4 mm longis, 3 mm latis; antheris oblongis 4-lobatis, 2-locularibus, ca. 0.8 mm longis; ovariis 3-locularibus; stylis 3, simplicibus, ad apicem ramis penicellatis; capsulis 1.5-1.8 mm longis, obovato-subglobois, 3-lobatis; seminibus nigris oblongis 0.6-0.8 (1.0 non sicco) mm longis, minute foveolatis in 16-18 lineis verticalibus.

TYPE: fastigiate perennial herb with conspicuous silvery stipules, narrow leaves and sessile white flowers; locally frequent on boggy open cumbre savanna,

at Cerro de la Neblina, 1900 m altitude, Territorio Amazonas, Venezuela, January 6, 1954, *Maguire, Wurdack & Bunting* 37133 (holotype, NY).

Distribution. Known only from the type locality in open bog savanna on the summit of Cerro de la Neblina, where the plant is a frequent member of the bog society.

*D. meristocaulis* seems to represent a primitive member of the genus for which there are no recognized close affinities. It fits into the subgenus *Rorella* DC according to the delimitation and arrangement of Diels<sup>10</sup> because of hypogaeous stems and conspicuous stipules. Its unique branching and (later) fastigiata and escapose habit exclude the plant from any other previously circumscribed section; this necessitates the erection of the new section, *Meristocaulis*, to accommodate it.

The other members of Guayana *Drosera*, all with non-branching, rosulate, scapose habit, belong to and find ready affinity in the section *Drosera* (*Rossolis* Planch.) with the exception of *D. sessilifolia* sect. *Thelocalyx*. It is difficult to perceive any direct or recent phyletic connection between *D. meristocaulis* and its Guayana congeners.

If the fundamental morphologic characters of *D. meristocaulis* indicate a derived condition, then apparently no intermediate stages toward this evolutionary apogee occur, or at least none have been observed in the Highland area or elsewhere. If the morphology of *D. meristocaulis* is to be interpreted as primitive, then one must postulate for it a remote single-line development from an ancient ancestral prototype, and that no derivatives now known have been cut off from it. We are inclined toward this latter view. In manner of branching, *D. meristocaulis* is most suggestive of the monotypic Hispanian and Moroccan genus *Drosophyllum* with which our plant has no affinity.

## 2. *Drosera sessilifolia* St.-Hil. Pl. Remarq. Brés. & Par. 1: 259. pl. 25A. 1824.

Type locality: Sertão do Rio S. Francisco, Minas Geraës, Brazil.

Distribution. Moist open places, generally at lower altitudes; southern and central and Territorio Rio Branco, Brazil; the Rupununi Savannas, British Guiana; and granitic areas below 500 m altitude in the Río Orinoco drainage, Venezuela.

## 3. *Drosera roraimae* (Klotzsch ex Diels) Maguire & Laundon,<sup>11</sup> stat. nov.

*D. montana* St.-Hil. var. *roraimae* Klotzsch ex Diels. Pflanzenreich 4 (112): 90. 1906.

*D. montana* St.-Hil. var. *robusta* Diels, Norizb. 6: 136. 1914.

Stem short, invested by marcescent leaves; leaves rosulate, more or less conspicuously tawny-strigose-hirsute on the lower surface; stipules conspicuous, lacerate, 0.4-0.6 mm long; petiole plane, 6-10 mm long; blade spatulate-obovate, ca. 3-5 mm broad, 5-6 mm long; scape 15-25 cm long; inflorescence coarsely stipitate-glandular, (5-) 10-15-flowered; flowers secund; pedicels 3-4 mm long; sepals stipitate-glandular, oblong-elliptic, acutish, 3.5-4.5 mm long (non-fertile flowers smaller); petals broadly obovate, 6-8 mm long; styles 3, dissected to the geniculate base, the apices forked; seed black, subclavate, 0.8-1.0 mm long, rounded-truncate at the apex, narrowed at the base, prominently low-bullate-papillate, the papillae in 15-20 more or less vertical rows.

TYPE: *Schomburgk* 1034, Mt. Roraima [Venezuela].

<sup>10</sup>Diels, L. Droseraceae. Pflanzenreich 4 (112): 62. 1906.

<sup>11</sup>In studies carried on at the British Museum, Mr. J. R. Laundon had independently concluded that *Drosera roraimae* should be removed from *D. montana* and elevated to specific status. When we learned of his concurrent opinion, we asked Mr. Laundon to join us in the presentation of *D. roraimae*.

Distribution. Wet boggy or sandy habitats, plateaus and mountain summits, on sandstone, throughout the Guayana Highland. Often flowers of some plants fail of fertilization or for some reason become abortive and do not produce seed. The flowers of such plants are smaller than those of fertile plants.

Specimens deposited at New York: BRITISH GUIANA: Chinowieng, Ayanganna Plateau, Maguire & Maguire 40645. VENEZUELA: Gran Sabana, Mt. Roraima: Tate 349, 373, 432A; Pinkus 98; Steyermark 58784, 58858; Auyán-tepuí, Tate 1116; Ptari-tepuí Steyermark 59743; San Rafael, Maguire 33614; Chimantá-tepuí, Steyermark & Wurdack 148; 462; Guaiquinima, Maguire 32759, 32825; Serra do Sol, Maguire & Maguire 40395; Terr. Amazonas: Cerro Duida, Tate 481, 674; Steyermark 58193; Maguire, Cowan & Wurdack 29696; Cerro Sipapo, Maguire & Politi 27570; Cerro Huachamacari, Maguire, Cowan & Wurdack 30155; Cerro de la Neblina, Maguire, Wurdack & Bunting 36931, 37110.

Specimens deposited at the British Museum and/or Kew. *Abnsettis* 11 (K); *Appun* 1157 (K); Forest Department of British Guiana 2864 (K); *Quelch & McConnell* 42 (K), 85 (K), 154 (K); 681 (BM, K); *Im Thurn* 313 (BM, K); *Ule* 8609 (K), 8610 (K).

Closely related to the variable, poorly understood and inadequately circumscribed population comprising *Drosera montana* St.-Hil., sensu lat., of the Brazilian Plateau, which is ordinarily a much smaller plant with a finer glandular pubescence, much shorter (3mm) stipules, and seed which are smaller, with more acute bases, and 8-10 sharply defined vertical rows of papillae.

4. *Drosera cayennensis* Sagot ex Diels, *Pflanzenreich* 4 (112): 86. 1906.

TYPE: *Sagot* 1228, French Guiana.

Distribution. Savannas of the Río Negro region, Brazil and French Guiana according to Diels; attributed by Brummer-dinger to the upper Orinoco region of Venezuela; Río Chiguirète, Edo. Bolívar, Venezuela, *Wurdack & Guppy* 17.

5. *Drosera arenicola* Steyermark, *Fieldiana Bot.* 28: 243. 1952.

Diminutive; stem very short, leaves rosulate, conferted; stipules 3 mm long; petioles 5-8 mm long, plane, little narrower than the blade, strigose beneath; blades narrowly oblanceolate, 4-5 mm long, sparingly or moderately strigose beneath, scapes 2-3 or sometimes solitary, 1-7 cm long, 1-10-flowered, moderately pilose-stipitate-glandular, particularly in the inflorescence; sepals lanceolate, acutish, ca. 2.5 mm long, rather strongly stipitate-glandular; styles 3, bipartite to the base; seed subglobose ca. 0.3-0.4 mm long, foveolate more or less in vertical lines.

*Drosera arenicola* var. *arenicola*.

Scapes 1-3, 1-2 cm long, 1-3 (4)-flowered; sepals acute, entire.

TYPE: Santa Teresita de Kavanayén, Gran Sabana, Edo. Bolívar, Venezuela, *Steyermark* 60920 (Holotype, F).

Additional specimens. Gran Sabana, Edo. Bolívar; Auyán-tepuí, *Tate* 1127; Kavanayén, *Lasser* 1739, 1811; Chimantá-tepuí, *Steyermark & Wurdack* 460, 1057.

Distribution. Known only from boggy savannas, Kavanayén, at 1200 m alt., and from the cumbres of Auyán-tepuí and Chimantá-tepuí, at 1800-2000 m alt.

*Drosera arenicola* var. *occidentalis* Maguire & Wurdack, var. nov.

Folia rosulata, conferta, 10-12 mm longa, subtus moderate fusco-strigosa; stipulis fusco-membrano-scariosis ca. 3 mm longis, in segmentis setaceis, ca. 2 mm longis divisis; petiolis 0.7-0.9 mm latis, 6-8 mm. longis; laminis anguste oblongo-oblanceolatis, 3-4 mm longis, ca. 1.5 (2.0) mm latis; scapis 1-3, 2-8 cm longis, moderate piloso-stipitato-glandulosis, (3) 4-10-floribus; sepalis subobtusis, inconspicue eroso-denticulatis vel integris; stylis ca. 3 mm longis, a basim bipartitis; apicibus integris, dilato-flabellatis; seminibus subgloboosis, nigris, plus minusve apiculatis, foveolatis in lineis verticalibus.



TYPE: flowers white, about margins of pool, infrequent, cumbre, Cerro Guanay, Río Manapiare, Río Ventuari, Terr. Amazonas, Venezuela, at 1800 m alt., February 2, 1951, *Maguire, Phelps, Hitchcock & Budowski 31715* (Holotype, NY). Paratypes, Terr. Amazonas, Venezuela: flowers pink, Cerro Guanay, at 1800 m alt., *Maguire, Phelps, Hitchcock & Budowski 31716*; Cerro Parú, Río Ventuari, 1949, *Phelps & Hitchcock 526-A*; flowers white, frequent, moist ledge, cumbre, Cerro Parú, at 2000 m alt., *Cowan & Wurdack 31142*; frequent, moist sand pockets, sabanita, west rim, Cerro Parú, at 2000 m alt., *Cowan & Wurdack 31205*.

Distribution. Known presently from the cumbres of Cerro Guanay in the north Ventuari drainage, and Parú in the south Ventuari drainage, Venezuelan Amazonas.

By virtue of its similar habit, identical leaves and seed, the var. *occidentalis* is to be associated with the eastern Gran Sabana *D. arenicola* Steyermark. The western variant differs chiefly in its consistently longer scapes, more numerous flowers, and less acute and erose-subdenticulate sepals.

6. *Drosera cendeensis* Tamayo & Croizat, Lilloa 17: 175. 1949.

TYPE: En el páramo de Cendé, Andes, Lara—Trujillanos, Venezuela, 3000 m alt., *I. Tamayo 1430* (Holotype, VEN).

Distribution. Known only by three collections made in the páramo in the vicinity of Cendé by Isabel Tamayo.

7. *Drosera kaieteurensis* Brummer-Dinger, Act. Bot. Neerl. 4: 137. 1955.

TYPE: Kaieteur Savanna, *Maguire & Fanshawe 23446* (Holotype, NY).

Distribution. Moist sandy or rocky situations in the Gran Sabana region of Venezuela and adjacent Pakaraima region of British Guiana. Ascribed by Brummer-Dinger also to Trinidad.

Additional specimens. British Guiana, Pakaraima Mountains: Membaru Creek, *Pinkus 24*; Karaurieng River, *Maguire & Fanshawe 32286*; Holi-tepu, *Maguire & Fanshawe 32517*; Chinowieng, *Maguire, Bagshaw & Maguire 40619*. Venezuela, Edo. Bolívar, Gran Sabana: Ptari-tepuí, *Steyermark 59970*; Kavanayén, *Steyermark 60497*.

8. *Drosera pusilla* H.B.K. Nov. Gen. & Sp. 5: 305. pl 490, f.1. 1821.

TYPE: Sandy places, Río Negro, Venezuela, *Humboldt & Bonpland sin. no.*

Distribution. Savannas and sandy places; Río Negro near San Carlos, Amazonas, Venezuela.

9. *Drosera intermedia* Hayne, Jour. Bot. Schrad. 1800 (1): 37. 1801.

TYPE: Hamburg near Eppendorf, *Hayne s. n.*

Distribution. Plants of wet sandy boggy and *Sphagnum* areas, Europe, North America, Central America, the West Indies; and in South America; Trinidad, British Guiana, Suriname (the coastal area and Tafelberg), the Gran Sabana, Venezuela.

10. *Drosera communis* St.-Hil. Pl. Remarq. Brés. & Par. 1: 267. 1824.

TYPE: Saõ Paulo, Brazil, *St.-Hilaire sin. no.*

Distribution. Colombia and southern Brazil, according to Diels; in Venezuela generally distributed but not common in areas of lower altitudes associated with sandstone.

11. *Drosera esmeraldae* (Steyerm.) Maguire & Wurdack, stat. nov., descr. emend.

*D. tenella* var. *esmeraldae* Steyerm. Fieldiana Bot. 28: 244. 1952.

Stems very short; leaves rosulate; petioles ca. 5 mm long, sparingly hirsute beneath or merely ciliolate; stipules adnate for 0.5–0.6 mm dissected to the base, with 5–6 acicular segments; blades suborbicular, ca. 2.0–2.5 mm in diameter, glabrous beneath; scapes solitary, capillary, glabrous, 5–8 cm long, 3–5-flowered;

flowers minute, the calyx ca. 2.5 mm long; hypanthium minutely and very sparingly glandular-puberulent; sepals broadly ovate, acutish, 1.5–2.0 mm long; petals broadly elliptic-ovate, 2.0–2.5 mm long, carpels 3; styles 3, bipartite to the base, the segments ca. 1.5 mm long, entire, obtuse or truncate; seed 0.3–0.4 mm long, black, narrowly oblong-elliptic, more or less biapiculate, foveolate in ca. 10 vertical rows.

TYPE: corolla pale lilac, wet places in savanna, between Esmeralda Savanna, and southeastern base of Cerro Duida, at 200 m alt., Terr. Amazonas, Venezuela, August 22, 1944, *Steyermark* 60920 (Holotype, F; isotype, NY).

Distribution. Known only by two collections, the type and *Maguire, Cowan & Wurdack* 29612 from Caño Culebra, Cerro Duida, at 1600 m alt.

The closest congener of *D. esmeraldae* seems to be *D. pusilla* H.B.K. This latter species is more diminutive, pluri-scapose, with flowers about twice larger (4–5 mm long), and seed subglobose.

12. *Drosera capillaris* Poir. in Lam. Encyc. 6: 299. 1804,

? *D. tenella* Willd. ex Roem. & Schult. Syst. Veg. 6: 763. 1820.

Type locality: Carolina, North America.

Distribution. Moist sandy areas in the coastal U. S. from Virginia to Texas; Central America; the West Indies; and South America from Venezuela to Brazil.

Venezuelan and Guianan plants, so far as available material indicates, are consistently smaller with conspicuously smaller flowers and seed. They seem to fit the description of *D. tenella*, which may well represent a distinct geographical race of *D. capillaris*.

LEGUMINOSAE-MIMOSOIDEAE<sup>12</sup>

*Parkia truncata* Cowan, sp. nov.

Arbor 20 m alta, ramulis minute sparseque puberulis. Folia alterna, pinnae (5-) 6-7 (-8)—jugata, oblongae; petiolus 3-3.5 cm longus, minute puberulus, in sectione triangularis, glande elliptica, depressa, petioli prope apicem posita, rachis (8.5-) 12-15.5 cm longa, in sectione plus minusve triangularis, minute puberula, rachilla 8-11 cm longa; foliola 15-25-jugata, uninervia, glabra, valde discolorata et facie superiore fusca, 12-18 mm longa, 4 mm lata, oblonga, ad basim inaequilateralia, latere inferiore in auriculam acutam prolongato, latere superiore obtuso, ad apicem truncata, integra vel leviter retusa, costa leviter salienti, venis planis supra, infra leviter salientibus. Inflorescentiae erectae, 55-100 cm longae, pedunculo 6 cm longo, sparse minuto-puberulo, ramulis paucis, ca. 10-12 cm longis, minuto-puberulis; capita ovata, ca. 4 cm diametro, parte inferiore flava, parte superiore fusca, axe clavato, 3.5-4.5 cm longo, puberulo; capitorum ad basim flora feminea, staminodiis 2 cm longis, filiformibus, glabris, calyce 6 mm longo, ad apicem puberulo, corolla glabra, ovario glabro, ad apicem flores hermaphroditi, calyce 5 mm longo, ad apicem puberulo, corollarum lobis ad apicem minutissime ciliolatis, staminorum filamentis 9 mm longis, ovario glabro, stipitato. Fructus immaturus angusto-oblongus, curvatus, 14-15 cm longus, ca. 2 cm latus, fuliginoso-velutinus, stipite 2.5-3.5 cm longo.

TYPE: tree 20 m tall. Inflorescences erect, sparsely branched. Lower part of head yellow, upper part with brown perianths and white stamens. Granite monadnock about 20 miles above Playa Alta, Río Cunucunuma, Terr. Amazonas, Venezuela, December 28, 1950, *Bassett Maguire, Richard S. Cowan & John J. Wurdack* 30440, (NY). Paratype: same data and collectors, 30453 (NY).

<sup>12</sup>By Richard S. Cowan.

The relationship of this species is certainly with *P. nitida* Miq., a Guianan species. *P. truncata* differs by its alternate leaves, by its lack of a waxy bloom on the lower leaflet surfaces, by truncate leaflets (hence the specific epithet), and by the erect inflorescences of heads, most of which are smaller than most of those *P. nitida* I have seen.

The fruits of *P. truncata* are dark-brown-velutinous but the presence or absence of pubescence in this group may not be very significant. In material assigned by Dr. Amshoff to *P. nitida*, the hermaphrodite flowers at the apex of the heads have glabrous or nearly glabrous pistils but the flowers near the base of the hermaphrodite part of the head are densely pubescent. In the flowering material of *P. truncata* the ovaries are uniformly glabrous but the fruiting specimen has densely velutinous pods. There is little doubt that the two collections are conspecific, although it is possible that two subspecific taxa are involved. It appears better to conclude that the presence or absence of pubescence is a character in this group which varies independently and indiscriminately.

#### LEGUMINOSAE-CAESALPINIOIDEAE

*Dicymbe* Spruce ex Benth. & Hook. Gen. Pl. 1(2):564. 1865.

In the winter of 1950, Drs. Maguire, Wurdack, and Cowan collected in Venezuela a leguminous plant which at the time was of unknown affinity generically and until this year it remained so. This winter, duplicates of the collections of this plant were sent to Mr. N. Y. Sandwith, who kindly studied it and suggested that it was to be associated with the genus *Dicymbe*. He also compared some of the types in this genus; for this assistance I am very grateful.

With the recognition of the relationship of that plant, several other collections proved to represent still other new species of the genus. In the light of these additions, it seems wise to present a preliminary treatment of the genus.

It is evident that in this group we are confronted with another of the reduction series which seem almost characteristic of this part of the Caesalpinioideae; the problem to resolve is the status to be accorded each of the stages of the series. The corolla is more involved in this group than any of the other flower parts. In sect. *Dicymbe* the corolla is composed of five, equal or subequal, petals; sect. *Triplopetala*, as the name implies, is characterized by three complete petals and two petalodia<sup>13</sup>; in sect. *Eremopetala* four of the five petals are reduced to petalodia but the fifth has a well-developed blade; and the species of sect. *Apoxyetala* have all the petals reduced to subulate-lanceolate petalodia. In spite of the obvious differences between the extremes of this reduction series, I feel that the phylogeny of the group is better expressed by treating it as one genus, consisting of two subgenera, each with two sections.

Of the four sections recognized, three require names and they have been named with Greek compounds signifying the petal condition of each group. *Eremopetala* refers to the single, "lonely" petal; *Apoxyetala* refers to the absence of complete petals, that is, the petals are "reduced"; and *Triplopetala* refers to the three complete petals of the one species included here. This is the species formerly referred to *Dicymbopsis* by Ducke and ordinarily the generic name would be used as a infrageneric epithet but here it is impossible, according to paragraph four of Article 31 of the Rules; the sectional name must not repeat the generic name with the ending "-opsis."

<sup>13</sup>For the distinction between petals and petalodia, see Mem. N. Y. Bot. Gard. 8:259 (1953).



The keys to the species in each of the sections is followed by notes on each of the species and citations of specimens seen; in all cases, only collections represented at the New York Botanical Garden are cited. There has been no attempt to arrange the species phylogenetically, but the related species are grouped together. Latin diagnoses to validate the subgenera and sections will be found in the part dealing with the species.

### Subgenera and Sections of *Dicymbe*

1. Complete petals 3 or 5, equal or slightly unequal; incomplete ones without well-developed blades. Sepals 4. Bracteoles without gland at the apex, free from the cupular hypanthium (except in *D. jenmani*).  
Subg. *Dicymbe* 2.
1. Complete petals one or none, incomplete ones without well-developed blades. Sepals 5. Bracteoles with terminal gland, united in basal part of the cylindrical hypanthium.  
Subg. *Apoxyptetala* 3.
2. Petals 5, without well defined stipes.  
Sect. *Dicymbe*.
2. Petals 3, stipitate (6. *D. amazonica*).  
Sect. *Triplopetala*.
3. Complete petal one, with distinct stipe.  
Sect. *Eremopetala*.
3. Complete petals none, all vestigial.  
Sect. *Apoxyptetala*.

### Sect. *Dicymbe*

1. Bracteoles less than 1.5 cm long. Hypanthium about 1 mm long. Leaflets narrowly lanceolate, 5-8 cm long, 1.5-2 cm wide.  
1. *D. heteroxylon*.
1. Bracteoles 2-3 cm long. Hypanthium much longer than 1 mm. Leaflets ovate, oval, or elliptic, 7-18 cm long, 3-7.5 cm wide.  
2.
2. Leaves 2-jugate, glabrous, the petioles 1.5-2 cm long, the blades minutely glandular-punctate on lower surfaces and on fruits.  
3. *D. corymbosa*.
2. Leaves 3-6-jugate, the petioles longer, the blades pubescent and epunctate.  
3.
3. Leaflets without waxy bloom on under surfaces but slightly strigulose. Petals strongly unequal, one much larger than the remainder.  
2. *D. altsoni*.
3. Leaflets with waxy bloom and densely pubescent on under surfaces. Petals equal or only slightly unequal.  
4.
4. Pubescence on the lower surface of leaflets erect, the hairs crispate; waxy bloom usually present in minute, annular granules. Bracteoles free from the cupular hypanthium; style 40 mm long; stigma 1.5 mm in diameter.  
5. *D. fraterna*.
4. Pubescence on the lower surface of leaflets subappressed, the hairs straight; waxy bloom usually in closely contiguous papillae. Bracteoles united to the cylindrical hypanthium through most of its length; style about 30 mm long; stigma less than 1 mm in diameter.  
4. *D. jenmani*.

### Sect. *Eremopetala*

1. Leaves 2-jugate, the leaflets 3-6.5 cm long, 2-3.5 cm wide, rotund and slightly retuse. Petals and filaments sparingly strigulose; one complete petal with a 4 mm stipe, attenuate at the base.  
7. *D. yutajensis*.
1. Leaves unijugate, the leaflets 8-10 cm long, 5-5.5 cm wide, only rotund. Petals and filaments villose; one complete petal with a 2 mm stipe and cordate at the base.  
8. *D. froesii*.

### Sect. *Apoxyptetala*

1. Bracteoles adnate to the hypanthium nearly to its apex; apical gland of bracteoles obvious, 1.5 mm long, umbilicate; petals villose. Leaves 5-jugate. 9. *D. uaiparuensis*.
1. Bracteoles adnate to the hypanthium about half its length; apical gland of bracteoles inconspicuous, less than 1 mm long, not umbilicate; petals slightly strigulose externally. Leaves 2-jugate.  
10. *D. duidae*.

### *Dicymbe* Subgenus *Dicymbe*.

A subgenere *Apoxyptetala* petalis 5 vel 3 (duobus haud expansis), aequalibus vel parum inaequalibus, sepalis 4, bracteolis ad apicem sine glande, liberis, hypanthio cupulari differt.

TYPE species: *Dicymbe corymbosa* Spruce ex Benth.

I. Section *Dicymbe*.

A sectione *Triplopetala petalis* 5, sessilibus differt.

1. *Dicymbe heteroxylon* Ducke, Trop. Woods 81:6. 1945.

This large forest tree is readily recognized by its small, lanceolate leaflets, its smaller flowers in which the hypanthium is shallowly cupular. The unequal androecium clearly relates it to *D. altsoni*; the leaflet pubescence also is identical in the two species.

Only one sheet, on which parts of both the flowering and the fruiting collections originally cited are attached, has been seen.

2. *Dicymbe altsoni* Sandwith, Kew Bull. 1928:371. 1928.

Trees of this species 20-35 m tall and 30-60 cm in diameter have been measured. It is in some sections of British Guiana very common, if not the dominant tree.

The size of the flower parts is variable, the petals especially; the one large petal varies from 2.5 to 3.5 cm in diameter and the other four from 1.5 to 2.2 cm in width. The filaments in the type collection vary from 7-17 mm in length while in a later collection they range from 15 to 25 mm long. The cupular hypanthium, free bracteoles, and unequal androecium relate this species to *D. heteroxylon*; the latter has narrowly lanceolate leaflets and smaller flowers.

The fruit was not known at the time of the original description but now a specimen with fruit has been collected. It is sericeous, alate at the dorsal margin, oblong, about 14 cm long and 4 cm wide. The seeds are compressed, oval in outline, 28-33 mm long, 24-26 mm wide.

Besides the type collection, *Altson* 459, the following collections represent this species: BRITISH GUIANA: Bartica-Potaro Road, *Fanshawe* 1057 (F. D. No. 3793), 2702 (F. D. No. 5495), 2749 (F. D. No. 5548).

3. *Dicymbe corymbosa* Spruce ex Benth. Trans. Linn. Soc. 25:303. 1865.

A complete description of this species is needed but until all the extant collections are assembled, it would seem to be unwarranted. An isotype and three other collections are at hand; only those parts not described originally in full are treated below.

Petioles 12-20 mm long, leaflets glandular-punctate and coarsely reticulate-veined on the lower surface, nitid above and with the costa salient and the veins plane. Inflorescence velutinous, bracts concave, oblong-oval, 10 mm long, 8 mm wide, obtuse, densely strigulose on outer surface, glabrous within except 0.5 mm wide tomentulose marginal band. Bracteoles ovate, deeply concave, (in bud) 18 mm long, 10 mm wide, thick-coriaceous, densely strigulose on the outer surfaces, glabrous within. Hypanthium shallowly cupular, 3 mm deep, 5 mm in diameter, densely strigulose outside, glabrous within; sepals ovate, cucullate apically and minutely erose marginally, glabrous, (in bud) 13 mm long, 7-8 mm wide; petals 5, elliptic, acute, glabrous except for broad sericeous band on the back of each; filaments 7.5-11 mm long (in bud), villose in the basal half, anthers 9-10.5 mm long with the connective villose; stigma peltate, 0.7 mm in diameter; style glabrous; ovary oblong, sericeous, 8 mm long, 2 mm wide, nearly sessile. Fruit oblong, 25 cm long, 4 cm wide, sulcate and bi-alate on dorsal margin, sparsely strigose and minutely gland-dotted, about 5-seeded.

Collections representing this species are: BRITISH GUIANA: *Fanshawe* 1017 (F. D. No. 3753), *Fanshawe* 2716 (F. D. No. 5515), *Lang* 312. BRAZIL: *Spruce* 2791 (type collection number).

The disjunction between the source of most of the collections and that of the type collection might raise legitimate questions, were there much morphological

diversity in the group. There is, however, very little such variation, at least in the few collections known. The glabrous and strongly punctulate leaflets, in only two pairs, serve to separate *D. corymbosa* from its relatives.

4. *Dicymbe jenmani* Sandwith, Kew Bull. 1928:373. 1928.

This is a small tree 2.5-8 m tall which is quite closely related to *D. fraterna*. It is apparently restricted to the sandstone mountains; it is now known from the Kaieteur Plateau and Mt. Ayanganna. (See the discussion following the description of *D. fraterna*.)

The following collections represent this species: BRITISH GUIANA: Kaieteur Plateau, Maguire & Fanshawe 23157, 32224, Maguire & Maguire 40683, 40687.

5. *Dicymbe fraterna* Cowan, sp. nov.

Arbor 3-20 m alta, ramulis novellis fusco-tomentulosis, stipulis non visis. Folia (2-) 3 (-4)-jugata, petiolis 4.5-5 cm longis, teretibus, fusco-tomentulosis, rachibus 4.5-11 cm longis, fusco-tomentulosis; petiolulis 4-5 mm longis, fusco-tomentulosis; foliolorum laminae ovatae, elliptico-ovatae, ellipticae, 8-17.5 cm longae, 4.5-7 cm latae, ad basim rotundatae, ad apicem acuminatae vel longo-acuminatae, glabrae nitidaeque supra, infra tomentulosae ceriferaeque, granulis cereis annulariformibus, minutissimis ornatae, costa impressa supra, infra salienti, venis salientibus infra, supra plana vel cum venulisque minute reticulatis. Inflorescentiae terminales et axillares, composito-corymbosae, tomentulosae tomentosaeque, 9.5-10 cm longae, sessiles, bracteis caducis, induratis, subsemicircularibus, obtusis, glabris intra, extus tomentosis; pedicellis 2-3 cm longis, tomentulosis et tomentosis, sulcatis, bracteolis liberis, crasso-coriaceis, late ovalibus, 26-28 mm longis, 14-20 mm latis, obtusis, tomentulosis et tomentosis extus, intus glabris vel sparse strigosis margine excepto, hoc 1-2 mm lato et dense tomentuloso, costa ad dorsum nonnihil salienti. Hypanthium cupulare 5.5-7 mm longum, 8.5-10 mm diametro, tomentulosum et tomentosum extus, intus glabrum; sepalia 4, uno dorsuali triangulari, 22 mm longo, 12 mm lato, acuto, dense strigoso extus, intus glabro, cetera anguste-triangulari-lanceolata, acuta, 20-22 mm longa, 5-6 mm lata, dense strigosa extus, intus glabra; petala 5, anguste-elliptica vel oblanceolata, acuta, dense strigosa extus, intus glabra, 25-27 mm longa, 7-12 mm lata. Stamina 10, 45 mm longa, basaliter villosa, antheris oblongis, glabris, 9 mm longis, 2 mm latis. Stigma peltatum, 1.5 mm diametro; stylus 40 mm longus, glaber; ovarium ca. 5 mm longum, 4 mm latum, densissime villosum, 9-ovulatum, gynophoro ca. 5 mm longo, dense villosa ad apicem. Fructus immaturus oblongus, dorsualiter sulcatus, ad 18 cm longus, 3-4 cm latus, lateraliter compressus, tomentosus villosusque.

TYPE: 3-4 m tree, lvs. glaucescent below; flowers creamy-white in rufous-tomentose inflorescences, young fruit rufous-velvety. Frequent on Samwaraknati (Holi-tipu), Pakaraima Mts., Kamarang R., British Guiana, Nov. 10, 1951, Bassett Maguire & D. B. Fanshawe 32535 (NY). Paratypes: tree 20 ft high, in sandy soil; calyx light brown; petals yellow. Membaru Creek, upper Mazaruni R., British Guiana, Sept. 23, 1939, Pinkus 31; tree 70 ft high; trunk 14 in diam. Pod brown without, lemon-yellow within, often 3-seeded; seeds white. Membaru Creek, upper Mazaruni R., British Guiana, Feb. 16, 1939, Pinkus 237; tree with brown fruit, Ayanganna to Chinowieng, Pakaraima Mts., 1000-1200 m alt., Feb. 7-8, 1955, B. Maguire, W. M. C. Bagshaw, & C. K. Maguire 40632.

The similarity in aspect between the new species and *D. jenmani* is so marked that the materials cited above were originally considered to represent the latter species. However, there are some very fundamental differences. *D. jenmani*



is the only species of this subgenus with a cylindrical hypanthium to which the bracteoles are united. These are characteristics of subgenus *Apoxyptala* but in all other respects *D. jenmani* belongs with the typical subgenus. It differs from *D. fraterna* in the type of pubescence and the shape of the wax-granules on the lower surface of the leaflets. *D. fraterna* also has a longer style, broader stigma, and cupular hypanthium, from which the bracteoles are free.

## II. Section *Triplopetala* Cowan, sect. nov.

A sectione *Dicymbe* 3 petalis stipitatis, duobus haud expansis differt.

TYPE species: *Dicymbe amazonica* Ducke.

### 6. *Dicymbe amazonica* Ducke, Arch. Inst. Biol. Veg. 4:15. 1938.

This is a very distinctive species in its possession of three petals; on the basis of this character it is considered to represent a distinct section. In most other respects it is quite closely related to the typical section, although it has a rather different facies. Only parts of the type collection, *Ducke* 35091, have been examined.

#### *Dicymbe* subgenus *Apoxyptala* Cowan, subg. nov.

A subgenere *Dicymbe* petalis singulis vel nullis, sepalis 5, bracteolis ad apicem glande praeditis, ad cylindrici hypanthii basim adhaerentibus differt.

TYPE species: *Dicymbe uaiparuensis* Cowan.

## III. Section *Eremopetala* Cowan, sect. nov.

A sectione *Apoxyptala* petalo uno stipitato ceteris haud expansis differt.

TYPE species: *Dicymbe froesii* Ducke.

### 7. *Dicymbe yutajensis* Cowan, sp. nov.

Arbor 4-8 m alta, ramulis fuscis. Folia bijugata, glabra, petiolis 2 mm longis, leviter compressis, rachibus 18-24 mm longis, supra leviter canaliculatis; petiolulis 1.5-2 mm longis, foliolorum laminae elliptico-ovales, coriaceae, margine leviter revoluta, 3-6.5 cm longae, 2-3.5 cm latae, ad basim obtusae vel subobtusae, ad apicem rotundatae leviter retusaeque, laminarum lateribus ambobus tenuiter venulosis praecipue infra, costa leviter impressa supra, infra salienti. Inflorescentiae terminales et axillares, composito-corymbosae, minute strigulosae, ca. 8 cm longae; pedicellis 7 mm longis, minuto-strigulosis, bracteolis oblongis, navicularibus, 8 mm longis, 4 mm latis, ad apicem umbonato-glandularibus, glande 1 mm longa, obtusa, lateribus ambobus minuto-strigulosis, ad hypanthii basem adhaerentibus. Hypanthium cylindricum, 3-4 mm longum, leviter minuto-strigulosum, sepala duo adaxilia cohaerentia, 4 mm longa, ca. 1 mm lata, subulato-lanceolata, acuta, glabra, cetera 5 mm longa, 1.5 mm lata, subulato-lanceolata, acuta, glabra; petala 5, uno adaxili petaloideo, stipite 4 mm longo, striguloso, lamina ca. 8 mm longa, 5 mm lata, cetera triangularia, 0.7-1 mm longa. Stamina 10, libera, filamentis 11.5-12.5 mm longis, ad basim strigulosis, antheris oblongo-ovalibus, 2 mm longis, 1 mm latis, glabris. Stylus ad basim strigulosus. Ovarium oblongum, 4.5-5 mm longum, 1.5 mm latum, striguloso-velutinum, stipite ad hypanthii murum adnatum, parte libera ca. 0.5 mm longa, striguloso-velutina. Fructus immaturus 6-6.5 cm longus, 2 cm latus, oblongus, leviter strigulosus, 3-4-seminifer.

TYPE: small bushy tree 4-8 m tall, fruiting only; lvs. 4-foliolate. Frequent on northwest ridge above Camp Yutaje, elev. 1500 m, Serrania Yutaje, Cerro Yutaje, Río Manapiare, Terr. Amazonas, Venezuela, February 23, 1953, *Bassett Maguire & Celia K. Maguire* 35379 (NY).

The large petal with four reduced ones places this species near *D. froesii* Ducke, from which it differs in number of pairs of leaflets, their shape and size, and the shape of the single complete petal.

The specific epithet will perhaps not please everyone, but geographic names used as specific names seem appropriate when the species involved are rather close endemics. It may be a little premature to speak of the geographic distribution in this genus, but the species appear to be quite localized in occurrence.

8. *Dicymbe froesii* Ducke, Trop. Woods 90:14. 1947.

The unijugate leaves with larger leaflets, the villose filaments and petals, and the shape of the one complete petal separate this species readily from its only near relative, *D. yutajensis*. The geographic disjunction between the two species is rather wide; the latter is from a sandstone mountain and it is likely that *D. froesii* is either to be found on sandstone or on sands derived from such sandstone mountains. Ducke related *D. froesii* to *D. corymbosa* but there is little more than a superficial resemblance between the leaves of the two species. Only an isotype has been seen.

IV. Section *Apoxyptala* Cowan, sect. nov.

A sectione *Eremopetala* petalis omnibus haud expansis differt.

TYPE species: *Dicymbe uaiparuensis* Cowan.

9. *Dicymbe uaiparuensis* Cowan, sp. nov.

Arbor 10 m alta, ramulis glabris, stipulis caducis non visis. Folia 5-jugata, glabra, petiolis 1.5 cm longis, teretibus, rachibus 8 cm longis; petiolulis 7 mm longis; foliolorum laminae lato-ovatae, coriaceae, 7-9.5 cm longae, 4.5-6 cm latae, ad basim cordatae, ad apicem acuminatae, extremitate obtusa, obscure minuteque venulosae, costa plana supra, infra salienti. Inflorescentiae terminales, composito-corymbosae, strigulosae, 6-10 cm longae, pedunculo 7-15 mm longo, bracteis caducis, non visis; pedicellis 17-25 mm longis, dense strigulosis, bracteolis strigulosis, coriaceis, ellipticis, 12 mm longis, 7 mm latis, ad apicem glande 1.5 mm longa, umbilicata praeditis, prope hypanthii apicem adhaerentibus. Hypanthium cylindricum, ca. 8 mm longum, strigulosum; sepala 5, anguste elliptico-oblonga, acuta ad acuminata, 9.5-12 mm longa, 1.2-2 mm lata, glabra; petala 5, aequalia, anguste elliptico-oblonga, acuta ad acuminata, dense villosa. Stamina 10, libera, filamentis ca. 24 mm longis, villosis ad basim latiorque, subulatis, antheris 3.5 mm longis, 1.5 mm latis, ovali-oblongis. Stigma peltatum; stylus ad basim dense strigosus; ovarium 5 mm longum, 2 mm latum, dense strigosum, stipite ad hypanthii murum adnato, parte libera ca. 1 mm longa, strigulosa.

TYPE: Arbol 10 m alto. Lomas de arenizca entre el cerro Perai, y las fuentes del Río Uaiparu, afluente del Ikabarú, 900 m, Caroni, Estado Bolívar, Venezuela, F. Cardona 1886 (NY; isotype VEN).

This species can be compared only to *D. duidae*, the only other species in this subgenus; the important differences separating them are set out in the key. The large apical gland on each of the bracteoles of the new species is especially striking and the larger number of pairs of leaflets is a useful characteristic to separate the two species.

10. *Dicymbe duidae* Cowan, sp. nov.

Arbor 4-7 m alta, glabra, ramulis fuscis, stipulis non visis, caducis. Folia paripinnata, bijugata, glabra, petiolis 10-20 mm longis, teretibus, rachibus 15-20(-35) mm longis; petiolulis 2.5-5 mm longis, foliolorum laminae lato-ovatae, coriaceae, 6-11.5 cm longae, 3.5-7.0 cm latae, ad basim cordatae, ad apicem

acutae, extremitate obtusa vel acuta, laminarum lateribus ambobus tenuiter venulosis, costa plana supra, infra salienti. Inflorescentiae terminales, compositocorymbosae (ramulis racemosis), minute strigulosae, 5-7 cm longae, bracteae citius caducis; pedicellis 9-10 mm longis, minute striguloso-velutinis, bracteolis oblongis, reflexis, ad apicem rotundatis, crasso-carnosis, subnavicularibus, striguloso-velutinis extus, intus leviter minuteque strigulosis, ad hypanthii basem adhaerentibus. Hypanthium cylindricum, 5-7.5 mm longum, minute strigulosum, sepala 5, subaequalia, subulato-lanceolata, 6-8 mm longa, 1.7-2.0 mm lata, acuminata, leviter strigulosa extus, intus glabra; petala 5, subaequalia, subulato-lanceolata, 3-3.5 mm longa, 0.8 mm lata, acuta, ad dorsum leviter strigulosa. Stamina 10, libera, filamentis ca. 16 mm longis, subulatis, glabris, antheris 4-4.5 mm longis, 1.5 mm latis, oblongo-fusiformibus, glabris. Stigma peltato-capitatum, minute papillatum, stylus ca. 17 mm longus, glaber, ovarium oblongum, 8 mm longum, 2 mm latum, velutinum, pluriovulatum, subsessile, stipite ad hypanthii murum adnatum, glabrum. Fructus oblongus, glaber, 9 cm longus, 2.5 cm latus, 4-5-seminifer, seminibus ovalibus, compressis, fuscis, 12-14 mm longis, 9-10 mm latis.

TYPE: small tree 4-7 m tall. Fruit bronze-green; buds tan. Petals pinkish, filaments greenish, anthers white. Leaves thin-coriaceous. Occasional in open scrub. Caño Negro Basin, north slopes and ridges, Cerro Duida, 2000-3000 m alt., Terr. Amazonas, Venezuela, Nov. 23, 1950, *Bassett Maguire, Richard S. Cowan & John J. Wurdack* 29667 (NY; isotype, K). Paratypes: same data and collectors 29665 and 29666 (NY).

*Dicymbe duidae* is easily separable from its only relative, *D. uaiþaruensis*, by the latter's more conspicuous apical gland on the bracteoles and the larger number of pairs of leaflets; there is also a difference in pubescence on the petals, and the degree of union between bracteoles and the hypanthium furnish additional distinguishing characters.

#### Excluded species

*Dicymbe psilophylla* (Harms) Dwyer, Ann. Missouri Bot. Gard. 41: 254. 1954.

*Tachigalia psilophylla* Harms, Notizbl. Bot. Gart. Berl. 6:305. 1915.

Dwyer in transferring Harms' species cites *Riedel 804*, the type collection number, and a Bondar collection, saying "The glabrous to subglabrous filaments of the stamens (fide Harms), the large reniform stipules, and the very long cigar-shaped fruits leave no doubt that this is a species of *Dicymbe*." I have examined this same material, kindly lent by the Chicago Natural History Museum, and it certainly is no known species of *Dicymbe* and almost surely is quite unrelated to that genus.

#### *Macrobium* Schreb.

Since the publication of my revision of this genus (Mem. N. Y. Bot. Gard. 8:257-342. 1953), it has been necessary to publish an urgent nomenclatural note (*Brittonia* 8:113. 1955), and now a number of new species have been recognized in recent collections made on New York Botanical Garden Expeditions in Venezuela. The new taxa are arranged in the approximate order they would have occupied in the revision; a revised key will be published to include all subsequent modifications when it appears that the rate at which new taxa are being collected has leveled off.

#### *Macrobium anomalum* Cowan, sp. nov.

Arbor(?), ramulis pilosis et pilosulis; stipulae caducae. Petiolus 3-5 mm longus, canaliculatus, pilosus et pilosulus. Foliorum laminae oblongae, 6-7-



jugatae; rachibus 3-6.5 cm longis, pilosis et pilosulis. Foliola 12-23 mm longa, 5-8 mm lata, oblonga, ad basim inaequaliteralia, obtusa, ad apicem rotunda et emarginata; supra in costam sparse uncinato-pilosula, infra glabra sed cerifera; costa plana supra, infra saliens. Inflorescentiae sessiles, axillares, 2-4.5 cm longae, axe puberulo; bracteae ovatae, acutae, 2 mm longae, 1.5 mm latae, puberulae extus, intus glabrae, deciduae. Pedicelli 1-1.5 mm longi, puberuli; bracteolae 5.5-6 mm longae, 3.5 mm latae, ovaes, mucronatae, puberulae extus, intus pilosulae. Hypanthium cupulare, ca. 1 mm longum, glabrum; sepala 5, glabra, dimorpha, 2 dorsualibus triangularibus, ca. 1.5 mm longis et 1 mm latis, acuminatis, 3 ceteris lanceolatis, ca. 4 mm longis et 1.5 mm latis. Petalorum lamina 4-4.5 mm longa, 4.5-5 mm lata, oblata, glabra, unguiculo 5 mm longo, glabro intus, extus pilosulo ad basim, leviter auriculato. Filamenta ca. 18.5 mm longa, dimidio basali villosa. Stigma capitellatum; stylus pilosus ad basim, ca. 16 mm longus; ovarium marginaliter pilosum lateraliter glabrum, gynophoro 2-2.5 mm longo, piloso. Fructus ignotus.

TYPE: Frequent at base of Caño Coro-Coro, near Base Camp, elev. 150 m, Cerro Coro-Coro, Río Manapiari, Terr. Amazonas, Venezuela, March 3, 1953, *Bassett Maguire & Celia K. Maguire 35510* (NY).

The relationship of this species is not particularly easy to determine but it is tentatively assigned a position approximate to *M. flexuosum* which it resembles in key characters more than in superficial aspect. It differs from *M. flexuosum* by its fewer leaflet pairs, smaller leaflets, and in the vestiture of the ovary. It is also related, to a lesser extent, to *M. microcalyx* and *M. discolor*. It differs from the latter by the smaller, differently shaped leaflets and generally shorter pedicels of *M. anomalum* but it is similar to *M. discolor* in number of pairs of leaflets. From *M. microcalyx* the principal character differences are the distribution of pubescence on the ovary, leaflet size and shape, vestiture of the branchlets, and the number of pairs of leaflets.

The specific epithet is intended to convey the unusual nature of this species in its relationship to so many species without being very closely allied to any one of them.

#### *Macrolobium longipes* Cowan, sp. nov.

Arbuscula 0.6-4 m alta, ramulis glabris. Stipulae triangulares, 2 mm longae, 0.6 mm latae, caducae, glabrae. Petioli 4-15 mm longi leviter marginati, glabri. Folia glabra, foliorum laminae (1-)2(-3)-jugata, rachibus (0-)10-35 mm longis. Foliola 40-85 mm longa, 12-31 mm lata, oblonga, oblongo-ovata, oblongo-elliptica vel elliptica, ad basim subaequaliteralia, acuta, ad apicem rotunda vel truncata, saepe leviter emarginata, latere inferiore punctato; costa plana supra, infra saliens, venulis subprominulis. Inflorescentiae 8-12.5 cm longae, terminales, glabrae, pedunculo 2-4 mm longo; bracteis caducis, triangularibus, ca. 1 mm longis et latis, glabris; pedicelli (9-)12(-16) mm longi, filiformes, glabri; bracteolae rubrae, 12-17 mm longae, 5-9 mm latae, ellipticae, acutae. Hypanthium cupulare, 2.5-3 mm longum, glabrum, sepalis 5, glabris, 5.5-8 mm longis, lanceolatis, ad apicem minute ciliolatis, duobus adaxillaribus ca. omnino coalescentibus. Petalum rubrum, lamina 5-6 mm diametro, rotundo, glabro, unguiculus 8-11 mm longus. Filamenta 20-25 mm longa, glabra. Stigma capitellatum; stylus ca. 22 mm longus, glaber; ovarium ellipticum, glabrum, gynophoro 3.5-4 mm longo, glabro. Fructus (immaturus) 8-9 cm longus, 3-3.5 cm latus, oblongus, glaber.

TYPE: Fls. red; fruit red at first, green later. Frequent in savanna on right bank of Río Pacimoni 50 km above mouth, Terr. Amazonas, Venezuela, 100-140 m elev., Feb. 7, 1954, *Bassett Maguire, John J. Wurdack & George S. Bunting 37590* (NY). Paratypes: VENEZUELA: Amazonas, Río Pacimoni: savanna on right bank,

60 km above mouth, 100–140 m elev., Nov. 1953, *Maguire, Wurdack & Bunting* 36676; frequent in savanna on right bank, 50 km above mouth, Feb. 1954, *Maguire, Wurdack & Bunting* 37572; frequent in savanna on left bank of Caño Hechimoni, 8 km above mouth, 100–130 m elev., Feb. 1954, *Maguire, Wurdack & Bunting* 37643.

There is every good reason for relating this species to *M. discolor* and to *M. multijugum*, although it is much nearer the former. From *M. multijugum* the new species may be separated most easily on the smaller number of leaflet-pairs, the short peduncles, the larger flowers, and the differently shaped fruits of *M. longipes* (the specific epithet refers to the unusually long pedicels). It differs from *M. discolor* by its punctate leaflets, glabrous inflorescence and flowers, larger flowers, and generally fewer pairs of leaflets.

*Macrolobium unifoliolatum* Cowan, sp. nov. (Fig. 64.)

Arbuscula vel arbor gracilis 7 m alta, ramulis minute puberulis. Petiolus 3–6 mm longus, minute puberulus, teres, stipulis caducis. Folia unifoliolata, foliola sessilia, lamina coriacea, 13.5–22.5 cm longa, 4.5–8 cm lata, lanceolata ad elliptico-lanceolata ad oblongo-elliptica, aequilateralis, ad basim obtusa ad subobtusata, ad apicem acuminata, glabra supra, infra glabra vel ad costam minute puberula, punctata; costa saliens vel leviter impressa supra, infra saliens, venis venulisque prominentibus. Inflorescentiae 2–12 cm longae, terminales vel axillares, axe minute puberulo, pedunculis subnullis; bracteis deciduis, triangularibus, ca. 1 mm longis et latis, intus glabris, extus glabris vel puberulis, minute ciliolatis; pedicelli 3.5–9 mm longi, puberuli vel glabri; bracteolis lanceolatis, 9–15 mm longis, 3–4 mm latis, longo-acuminatis, glabris vel extus puberulis. Hypanthium cupulare, 2 mm longum, glabrum, sepalis 4, glabris vel ciliatis et dorsualiter pilosulis ad apicem, dimorphis, sepalo dorsuali 5 mm longo, 2.5 mm lato, oblongo-lanceolato, acuto, caeteris 3.5–4 mm longis, 1–1.5 mm latis, acuminatis et plus minusve erosis. Petalum album, lamina rotunda vel subrotunda, 3.5–5.5 mm longa, 4.5–5.5 mm lata, glabra, unguiculo 4.5 mm longo, intra villosa. Filamenta 10–12.5 mm longa, ad basim sparse villosa. Stigma capitellatum, stylus 12.5–20 mm longus, ad basim pilosulosus, ovarium ellipticum, pilosulosum. Fructus ignotus.

TYPE: petal white; stamens red; slender tree 7 m tall in riverine forest just south of Maroa, Río Guainía, Terr. Amazonas, Venezuela, 120–140 m alt., Nov. 28, 1953, *Bassett Maguire, John J. Wurdack & George S. Bunting* 36445 (NY).

*Macrolobium unifoliolatum* var. *schultesii* Cowan, var. nov.

A var. *unifoliolatum* petiolis 3–4 mm longis, foliolis ad costam puberulis, costa supra salienti, inflorescentia 6.5–12 cm longa, axe dense puberulo, bracteis puberulis extus, pedicellis 4–9 mm longis, dense puberulis, bracteolis 9–10.5 mm longis, extus dense puberulis, sepalis dorsualiter pilosulosis ad apicem, petali lamina rotundo, 5.5 mm diametro, filamentis 12.5 mm longis, stylo 12.5 mm longo differt.

TYPE: bush, flowers white, Raudal Yayacopi (La Playa) and vicinity, about 800 ft alt., Río Apaporis, Amazonas-Vaupés, Colombia, April 15, 1952, *Richard E. Schultes & I. Cabrera* 16209 (NY). Paratype: same data and collectors, 16940.

This species is so utterly different from any previously described, in respect to the leaves, that the casual observer may even fail to relate it to this genus. Not only are the leaves unifoliolate but the leaflet is equilateral and differently shaped from those of most of the other species in the genus. In leaflet shape, at least, the new species is similar to members of the *M. campestre*-*M. arenarium* complex but its connection with any known species is remote.

The aspect of the typical variety and of variety *schultesii* is very similar, and it was originally thought that this material was quite uniform. It will be noted,



FIG. 64. *a, b*, *Macrolobium unifoliolatum* var. *unifoliolatum*, *a*, habit,  $\times \frac{1}{4}$ , *b*, one flower enlarged,  $\times 4$ . *c, d*, *Macrolobium exfoliatum*. *c*, one flower enlarged,  $\times 4$ . *d*, habit,  $\times \frac{1}{2}$ . *a, b*, from Maguire, Wurdack & Bunting 36445; *c, d* from Maguire & Wurdack 34981.



however, that there are a number of characteristics separating the two varieties. It is a pleasure to name this taxon for one of the collectors of the type material, Dr. Richard Evans Schultes.

**Macrobium canaliculatum** var. **strigulosum** Cowan, var. nov.

Arbor 6-8 m altus, ramulis et foliis glabris. Petiolus 4-6 mm longus, desuper compressus, canaliculatus; petioli 0-1 mm longi. Foliola 5-8.5 cm longa, 2.5-4 cm lata, oblonga ad obovato-oblonga, ad basim inaequilateralia, acuta, ad apicem rotunda et leviter emarginata, infra punctata; costa sulcata supra, infra saliens, venis venulisque prominulis. Inflorescentiae (frugiferae) terminales, ca. 8-10 cm longae, axe dense aureo-striguloso, pedunculo ca. 10-20 mm longo. Fructus 10-12.5 cm longus, 3.5-4 cm latus, oblongus, ad suturam dorsualem alatus, glaber, carpophoro 7-9 mm longo, sparse striguloso, 2-5-seminifer, semina immatura ovalia.

TYPE: Occasional in woodland along right fork of Caño Yutaje, elev. 1500 m, Serranía Yutaje, Río Manapiare, Terr. Amazonas, Venezuela, Feb. 21, 1953, *Bassett Maguire & Celia K. Maguire 35361* (NY).

In spite of rather strong convictions against the practice of describing new taxa based on less than complete material, I have described this one on fruiting material only. This course is adopted because I am certain that this is a new taxon and, while it has been treated here as a variety, later flowering collections may prove it to be of specific stature.

Its connection with *M. canaliculatum* is unmistakable but it differs in its strigulose inflorescence axis (hence the varietal epithet), its punctate leaflets, and its sessile or very shortly petiolulate leaflets.

**Macrobium rubrum** Cowan, sp. no.

Arbusculae 0.2-2 m altae, ramulis minutissime puberulis; stipulae caducae. Folia glabra, unijugata, rigido-coriacea; petiolus 6.5-12 mm longus, 3 mm diametro, desuper compressus. Petioluli 1-3 mm longi, glabri. Foliola 7.5-15 cm longa, 3-6 cm lata, valde inaequilateralia, arcuata, elliptica, basis latere inferiore auriculato, superiore acuto ad subobtusum, ad apicem acuta et extremitate saepe obtusa; costa sulcata supra, infra saliens, venuli conspicui. Inflorescentiae 4-13 cm longae, terminales, axe minutissime puberulo, pedunculo 0-2 mm longo; bracteis caducis, triangularibus, 1.5 mm longis et latis, acutis, minutissime puberulis extus, intus glabris. Pedicelli 2-4 mm longi, minutissime puberuli; bracteolae 12-14 mm longae, 4 mm latae, oblanceolato-oblongae, obtusae, carnosae, glabrae. Hypanthium 3.5-4 mm longum, glabrum, stipite 1-1.5 mm longo, glabro. Sepala 4, aequalia, 10-11 mm longa, 3-3.5 mm lata, cucullata, oblanceolato-oblonga, ad apicem ciliolata. Petalorum lamina 7 mm longa, 5.5 mm lata, ovalis, glabra, unguiculo ca. 10 mm longo, glabro extus, intus pilosulo, late alato. Filamenta 18-20 mm longa, ad basim villosa. Stigma capitellatum; stylus ca. 14 mm longus, glaber, ovarium ca. 3 mm longum, 1 mm latum, oblongum, glabrum, gynophoro 3.5 mm longo, glabro. Fructus (immaturus) 8-11 cm longus, 3-4 cm latus, oblanceolato-oblongus, ad suturam dorsualem anguste alatus, glaber.

TYPE: Bracts, petal, and stamens red; fruit green. Abundant in sabanita 1 km east of Maroa, elev. 125 m, Río Guainía, Venezuela, April 16, 1953, *Bassett Maguire & John J. Wurdack 35684* (NY). Paratypes: VENEZUELA: Amazonas, Río Guainía: frequent in Sabana El Venado on left bank of Caño Pimichin above Pimichin, elev. 140 m, April 1953, *Maguire & Wurdack 35620*; frequent in sabanita 1 km east of Maroa, 130 m elev., Nov. 1953, *Maguire, Wurdack & Bunting 36412*.

In the key in my revision, *M. rubrum* will run out quite near to *M. punctatum*, and they are rather closely related species. However, they are separable by

several differences: (1) the new species has leaflets on which the costa is more or less sulcate on the upper surface; (2) its bracteoles are considerably larger; (3) its hypanthium is usually longer, and on a shorter stipe; and (4) the sepals and the petal-claw are markedly longer. In floral dimensions, the new species is nearer *M. canaliculatum* but the latter has the petal reflexed and it has rather differently shaped leaflets to separate it from *M. rubrum*.

The specific epithet is chosen as being descriptive of the completely red flowers of this species. In other taxa of the genus, various parts of the flower may be red or reddish but completely red flowers are unusual.

*Macrolobium wurdackii* Cowan, sp. nov.

Arbor 15 m altus, 20 cm diametro, ramulis et foliis glabris, stipulae mox caducae. Petiolus 30-35 mm longus, ca. 4 mm diametro. Folium unijugatum, foliola sessilia, 32-39 cm longa, 12-14 cm lata, inaequilateralia, leviter arcuata, elliptica, ad apicem rotunda, ad basim inaequilateralia, basis latere inferiore cordato, superiore acuto; costa valde saliens, venae et venulae conspicuae. Inflorescentiae e nodis defoliatis ortae, 12.5-22 cm longae, axe dense crasso-puberulo, pedunculo 6-12 mm longo; bracteis deciduis. Pedicelli 6-9 mm longi, dense crasso-puberuli; bracteolae caducae (fragmento solum praesente), crassissimo-carnosae, crasso-puberulae extus et ad basim intus. Hypanthium 3.5-5 mm longum, crasso-puberulum, stipite 3-3.5 mm longo, crasso-puberulo; sepalis 4, oblongis ad ovalibus, obtusis, concavis, 10-11 mm longis, 5-7 mm latis. Petala decidua, 2-3 vestigialia nonnunquam praesentia. Filamenta 16.5-17.5 mm longa, villosa, 3-4 filamentis vestigialibus praesentibus, villosis. Stigma capitellatum, puberulum, stylus 9.5-10.5 mm longus, ad basim crasso-puberulus, ovarium ellipticum vel elliptico-oblongum, ca. 5 mm longum, 2 mm latum, 4-ovulatum, dense crasso-puberulum, gynophoro 5 mm longo, crasso-puberulo. Fructus ignotus.

TYPE: In young fruit with orange-maroon calyx. Frequent in slope forest at Camp III, elev. 650 m, Cerro de la Neblina, Rio Yatua, Terr. Amazonas, Venezuela, January 26, 1954, *Bassett Maguire, John J. Wurdack & George S. Bunting* 37385 (NY).

This is perhaps one of the most distinct species in the genus and it is a genuine pleasure, therefore, to name it in honor of my good friend, colleague, and one of the collectors of the type material, Dr. John J. Wurdack.

*M. wurdackii* is most closely allied to *M. latifolium* but there are abundant differences to separate them. *M. latifolium* is now restricted to the isolated, coastal rain forest near Bahia, Brazil, while the new species occurs on the opposite side of the Amazon Basin in southwestern Venezuela; so geographically speaking, the two relatives are very disjunct. Both species have exceedingly thick, fleshy bracteoles which are early deciduous, four equal to subequal sepals, and much the same type of pubescence. The hairs of *M. latifolium* have been described as clavate in shape but those of the new species are more "peg-like" and have been referred to as thick or coarse in the description.

The two species differ in: (1) habit; (2) leaflet size and shape; (3) position of inflorescence; and (4) flower size.

*Macrolobium savannarum* Cowan, Mem. N. Y. Bot. Gard. 8:323. 1953.

In the original description of this species, characters of the fruit were not supplied because material was not then available. Now a single fruiting collection (*Maguire & Wurdack* 34522) from the type locality has been received and they may be described as follows: Fruits glabrous, 6.5-8 cm long, 2.5-3 cm wide, oblong, carpophore about 4 mm long; seed laterally compressed, 15 mm long, 12 mm wide, broadly oval, the testa tan, very thin-crustose.

As might have been expected, the fruits of *M. savannarum* are quite similar to those of its nearest relative, *M. pendulum*.

**Macrobium exfoliatum** Cowan, sp. nov. (Fig. 64.)

Arbor 8 m alta, 10 cm diametro, cortice ramulorum exfoliato. Folia unijugata; petioli 4.5-5 mm longi, glabri, leviter sulcati; stipulae persistentes, 4.5-6 mm longae, 1-2 mm latae, arcuato-lanceolatae, acutae, ciliolatae. Foliola sessilia, 9-15 cm longa, 3.5-5.5 cm lata, glabra, coriacea, leviter arcuata, elliptico-oblonga, ad basim inaequilateralia, latere inferiore rotundo-obtuse sed superiore acuto, ad apicem rotunda, emarginata, epunctata; costa salienti, venulis leviter salientibus. Inflorescentiae 7-10 cm longae, e nodis defoliatas ortae fasciculatae, sessiles, axe minute puberulo; bracteis persistentibus, triangularibus, ca. 1 mm longis et latis, extus minute puberulis, intus glabris; pedicellus 3-5.5 mm longus, minute puberulus; bracteolae 5.5-7 mm longae, 3 mm latae, ellipticae, glabrae intus, extus minute puberulae. Hypanthium cupulare, 1.5 mm longum, minute puberulum; sepala 4, ovata ad angusto-lanceolata, 2.5-4.5 mm longa, 1 mm lata, glabra, sepala adaxilia biloba vel integra. Lamina petali rotunda, 5 mm longa et lata, unguiculo 5 mm longo, ad basim villosulo. Filamenta 21 mm longa, villosula, antherae ad basim villosulae. Stigma punctiforme, stylus ca. 20 mm longus, ad basim minute puberulus, ovarium 2.5 mm longum, 1 mm latum, minute puberulum. Fructus ignotus.

TYPE: In riverine forest near Piedra Nunca (just north of Piedra Cucuy), elev. 100 m, Río Negro, Terr. Amazonas, Venezuela, April 10, 1953, *Bassett Maguire & John J. Wurdack 34981* (NY).

In my key this species will "key-out" near *M. amplexans*, which species it resembles in the disposition of its inflorescences and in the characters of the flowers. However, the new species is quite distinct in respect to leaflet shape, exfoliating bark on the branchlets (hence the specific epithet) as well as other, more minor, characters.

LEGUMINOSAE-LOTOIDEAE

**Clitoria cerifera** Cowan, sp. nov. (Fig. 65.)

Arbuscula virgata 1.5-2.5 m alta, ramulis strigulosis, novellis 4-angulatis. Stipulae persistentes, 4.5-5 mm longae, 1.5-2 mm latae, lanceolatae, acuminatae, parce striatae, strigulosae extus, intus glabrae. Folia 3-foliolata, petiolo 2.5-5.5 cm longo, angulato, parce striguloso, rachibus 2-3 cm longis, angulatis, parce strigulosis. Stipellae persistentes, 3.5-4.5 mm longae, 0.5-1 mm latae, lineari-lanceolatae, acuminatae, glabrae, rigidae. Foliolorum lamina lanceolata ad ovato-lanceolata, petiolulis 3-4 mm longis, parce strigulosis, 10.5-11.5 cm longa, 3.5-4.5 cm lata, ad marginem involuta, ad apicem acuminata, extremitate obtusa mucronulataque, ad basim rotunda, glabra (costa parce strigulosa excepta), infra cerifera, costis impressis supra, infra salientibus, venis primariis 6-8-jugatis, venulis prominentibus. Inflorescentiae 4.5-6 cm longae, ad nodos defoliatas ortae, axe ca. 2 mm longo, striguloso, bracteis persistentibus, 3.5 mm longis, 1.5 mm latis, lanceolatis, extus parce strigulosis. Pedicelli 5-8.5 mm longi, pilosuli, bracteolis, 2.5-4 mm. infra calycem, 4-5 mm longis 1-1.5 mm latis, lanceolatis, striatis, pilosulis. Calycis tubus 15-18 mm longus, minute uncinato-puberulus et parce pilosus extus, intus glaber, lobis 3-8 mm longis, 2 dorsualibus lobis brevioribus lanceolatis ad deltoideis, acutis ad longo-acuminatis, minute uncinatis extus, intus glabris. Vexillum late obovatum, 55 mm longum, 45 mm latum, minute uncinatum et ad basim pilosulum extus, intus glabrum; alae falcato-oblongae, lamina 30 mm longa et 10 mm lata, unguiculo ca. 12 mm longo, minute uncinatae extus, intus





FIG. 65. *Clitoria cerifera*, a, habit  $\times \frac{1}{2}$ . b, one flower enlarged,  $\times 1$ . based on Maguire, Wurdack & Bunting 37580.

glabrae; carinarum petala longo-unguiculata (ca. 20 mm), lamina 15 mm longa et 5 mm lata minute uncinata extus, intus glabra. Staminorum filamenta 38 mm longa, connata per 33 mm, glabrum, antherae 2.5 mm longae, 0.5 mm latae, lineares. Stylus 25 mm longus, ovarium 12 mm longum, 1 mm latum, lineare, sericeum, 15-ovulatum, gynophoro 8 mm longo, piloso. Fructus ignotus.

TYPE: virgate shrub 2 m tall. Calyx reddish; banner pale lilac, basally with fine red-purple lines; keel and wings white; frequent in dry part of savanna on right bank of Río Pacimoni 50 km above mouth, 100-140 m elev., Terr. Amazonas, Venezuela, Feb. 7, 1954, *Bassett Maguire, John J. Wurdack & George S. Bunting* 37580 (NY). Paratype: shrub 1.5-2.5 m tall. Occasional in savanna on left bank of Caño Hichimoni 8 km above mouth, 100-130 m elev., Terr. Amazonas, Venezuela, Feb. 1954, *Maguire, Wurdack & Bunting* 37635.

The probable nearest relative of *C. cerifera* is another arborescent species—*C. arborescens*. However, the new species is readily distinguishable by the very different venation of the leaflets, the ceriferous and nearly glabrous undersurfaces of the leaflets, the smaller bracteoles and larger standard.

#### POLYGALACEAE

*Securidaca ecristata* Wurdack, sp. nov.

Frutex scandens; ramuli teretes, aequae cum petiolis inflorescentiis pedicellisque modice persistenterque hirsutuli. Folia elliptica vel leviter ovato-elliptica apice acuta vel anguste obtusa basi late acuta vel anguste obtusa sub inflorescentiis 3-5 × 2.5-3.5 cm apud inflorescentias minora, coriacea, marginibus sparsissime hirsutulis leviter revolutis, supra vix nitida vel nitidula costa basi extremae sparse hirsutula alioqui (marginibus exceptis) glabra subtus manifeste pallidiora sparse vel modice aureo-strigulosa, costa supra impressa subtus elevata, nervis primariis utrinque 7-9 supra et subtus leviter elevata inconspicue laxaeque reticulata; petiolus gracilis 5-7 mm longus basi glandulis inconspicuis. Paniculae terminales laxae parvae ramis 2-4 cm longis; bracteae inconspicuae 1-1.5 mm longae valde caducae. Pedicelli 5-6 mm longi. Sepala exteriora ovato-orbicularia extus modice strigulosa ciliolata intus glabra vel ad basim extremum sparse strigulosa; posticum 3.8-4.2 × 3.5 mm; dua antica 3-3.2 × 2.8-3.5 mm; alae ungue 2 mm longo extus glabro vel sparse hirsutulo intus sparse hirsutulo, lamina ovato-orbicularia 5-5.5 × 5.5 mm leviter emarginata ciliata alioqui glabra. Petala lateralia oblonga vel leviter spathulato-oblonga rotundata 6.5-7.2 × 2.5-2.9 mm basim versus sparsissime ciliolata intus parte tertia basali sparse hirsutula alioqui glabra dente laterali inconspicuo; carina tota 6.5-7 mm longa ungue 2-2.5 mm longa ciliata intus marginem basalem versus sparse hirsutula alioqui glabra crista nula (dente parvo simplico ad apicem carinae 0.1-0.3 mm longo). Staminum vagina 5-5.2 mm longa extus marginem versus et per costam hirsutula intus marginem versus parte centralique hirsutula; filamenta libera 0.3-0.5 mm longa; antherae 0.8-1 mm longae ellipticae rotundae. Ovarium glabrum ala strigulosa stipite 0.5-0.7 mm longo; stylus leviter curvatus glaber 4-4.5 × 0.6 mm. Fructus 3.2-3.7 cm longus sparse strigosus parte seminifera 6-7 mm diametro vix reticulata; ala prima 2-2.8 × 1.3-1.6 cm margine exteriori recta vel vix curvata interiore leviter recurvata; ala secunda subparva 4-7 × 2-3 mm parte 2-4 mm terminali libera.

HOLOTYPE: woody vine, sepals pale purple, keel yellow, cumbre near Summit Camp, Cerro Huachamacari, Río Cunucunuma, Terr. Amazonas, Venezuela, elev. 1800 m, Dec. 6, 1950, *Maguire, Cowan & Wurdack* 30009 (NY). Paratypes: woody vine, lvs coriaceous, fls purple-red, occasional in cumbre near Summit Camp,

Cerro Huachamaçari, elev. 1800 m, Dec. 10, 1950, Maguire, Cowan & Wurdack 30085; woody vine, sepals purple, keel yellowish, frequent in cumbre near Summit Camp, Cerro Huachamaçari, elev. 1800 m, Dec. 15, 1950, Maguire, Cowan & Wurdack 30251.

*S. ecristata* is related to a poorly defined group of ecristate Andean taxa with pubescent ovary wings: *S. atropurpurea* Turcz., *S. dasycarpa* Turcz., *S. densiflora* Lind. & Pl., *S. purpurea* Lind. & Pl., *S. planchoniana* Killip & Dugand, *S. trianaei* Killip & Dugand, and *S. schlimii* Pl. & Lind. ex Tr. & Pl. The first four of these have leaves evenly pubescent above and loosely puberulent below. *S. trianaei* has large flowers; *S. schlimii* has alae prominently strigulose externally, leaves of a different shape, and branchlets with spreading pubescence; and *S. planchoniana* has alae densely strigulose externally and leaves densely rufous-puberulent below. Probably other floral differences exist, but authentic material of all the Andean taxa has not been seen; however, Dr. Cowan examined type material of several species for me at Kew and the British Museum.

*Securidaca savannarum* Wurdack, sp. nov.

Frutex scandens; rami teretes valde ramulosi aequae cum petiolis inflorescentiis pedicellisque modice albo-hirsutuli. Folia ovato-elliptica vel elliptica apice late acuta vel rotundata basi rotundata vel leviter emarginata, infra inflorescentias 3-5.5 × 2-3.5 cm apud inflorescentias vix minora crasse coriacea marginibus revolutis extremibus sparsissime hirsutulis, supra nitida glabra, subtus conspicue pallidiora modice vel sparse aureo-strigulosa, costa supra leviter impressa subtus prominente, nervis primariis utrinque 6-8 supra leviter expressis vix reticulatis subtus leviter expressis reticulatisque; petiolus 2-3 mm longus robustus basi glandulis corneis 1-1.5 mm diam. vix elevatis praeditus. Racemi axillares inconspicui 1-1.5 cm longi solitarii-terni glandulis corneis 0.5-0.8 mm diam. in rhachibus flores subtendentibus; bracteae parvae 0.6-0.8 mm longae; pedicelli 3-5 mm longi graciles. Sepala exteriora orbiculari-ovata apice rotunda extus per costam aut per partem centralem sparse hirsutula intus modice strigulosa; posticum 2.3-3 × 2 mm; dua antica 2-2.7 × 1.7-2 mm; alae unguis vix distinctus, ala 5-6.5 × 4.4-5 mm glabra eciliata lamina orbiculari-obovata vix emarginata. Petala lateralia oblonga rotunda 5-6 × 1.5-1.7 mm parte media sparse ciliata extus parte media sparse hirsutula intus parte media basique modice hirsutula, dente laterali vix conspicua; carina tota 5.5-6 mm longa glabra eciliata, ungue 2.3-2.9 mm longo, crista pro flore grandi ut plicata 0.7 × 2 mm plus minusve integra vix undulata transverse medieque plicata. Stamina vagina 5-5.5 mm longa extus glabra vel parte dimidia basali sparsissime hirsutula intus parte dimidia basali dense hirsutula; filamenta libera 0.3-0.5 mm longa; antherae 0.3-0.4 mm longae apice rotundae. Ovarium 1-1.2 mm longum inaequaliter bialatum ala minori sparsissime hirsutula vel glabra alioqui glabra stipite 0.2 mm longo, stylo gracili 4.3-4.8 mm longo 0.2 mm lato parte tertia distali curvato (angulo 60°-80°), stigma 0.5 mm latum. Fructus ignotus.

HOLOTYPE: vine in shrubs, fls creamy yellow with lateral petals apically purplish, edge of Savanna No. 1, northwest base of Cerro Yapacana, Alto Rio Orinoco, Terr. Amazonas, Venezuela, elev. 150 m, Mar. 17, 1953, Maguire & Wurdack 34499 (NY). Paratype: same locality, Jan. 7, 1951, Maguire, Cowan & Wurdack 30776.

The leaves of *S. savannarum* are not unlike those of *S. ecristata*, but thicker and more nitid; in flower structure however, there are many differences. Perhaps the closest relative is *S. lateralis* A. W. Benn., which has a similar large carinal crest (vide A. C. Smith 3170 and Wilson-Broune 658); the British Guiana specimens may be distinguished by the thinner leaves with more cordate bases and looser



and longer hairs on the lower surface, smaller distinctly elevated petiolar glands, and much larger flowers with alae about 12 mm long. *S. lateralis* was described from a Spruce collection from Manaos. Such a disjunct known distribution is also evident in *S. uniflora* Oort, known from several collections in the Guianas and also from Manaos (*Ule* 8886, fide Sandwith in litt., and *Ducke* 1769, 23-IX-1945).

*Securidaca speciosa* Wurdack, sp. nov.

Frutex scandens; ramuli teretes, aequae cum petiolis inflorescentiis pedicellisque pilis parvis patentibus modice et persistente induti. Folia elliptico-ovata apice obtusa minute apiculataque basi obtusa vel subcordata in sicco plerumque conduplicata infra inflorescentias 4.5-8.5 × 2.5-6 cm apud inflorescentias minora coriacea marginibus non incrassatis, supra nitida glabra (praeter nervum medium sparse hirsutulum), subtus pallidiora nervo medio persistenter hirsutulo venulis superficieque statu juvenili sparse hirsutulis glabrescentibus, nervis primariis utrinque 6-8 reticulo supra et subtus manifesto; petiolus 3-5 mm longus basi glandulis inconspicuis 0.2 mm diam. Paniculae terminales speciosae ramis 7-45 cm longis; bracteae valde caducae parvae 1.3-1.7 mm longae. Flores purpurei (in sicco albidii). Sepala exteriora late ovata apice obtusa vel rotunda ciliolata extus sparse strigulosa intus glabra, uno postico 4.3-4.8 × 3.3-3.6 mm duobus anticis 3.4-3.8 × 2.8-3.4 mm; alae ovato-orbicularies 11-14 × 3.5-10.5 mm apice leviter retusae, ungue breve, marginibus ciliatis cetero glabris. Petala lateralialia obovato-spathulata apice late obtusa 9-10 × 4-5.2 mm intus basim versus sparse hirsutula atque sparse ciliolata extus glabra dente laterali inconspicuo; carina tota 10-11 mm longa ungue 2-3 mm longo ciliolata intus marginem basalem versus hirsutula, crista parva 1 mm alta 2-2.3 mm lata subintegra irregulariter denticulato-crenata. Staminum vagina 6-6.7 mm longa basim versus ciliolata et intus basim marginemque versus hirsutula; filamenta libera 3-3.5 mm longa; antherae 0.8-1.3 mm longae apice acutae vel brevicaudatae. Ovarium aequae cum ala glabra, stylo ad medium aut supra gradatim geniculato (angulo ultimo 90°) glabro 7-10 × 0.6-0.7 mm, stigma 1-1.2 mm latum. Fructus maturus non visus, fructu maxime immaturo toto glabro.

HOLOTYPE: scandent shrub, frequent in open rocky places, Raudal Ouraima, Rio Paragua, Edo. Bolívar, Venezuela, elev. 175 m, Jan. 20, 1952. *Maguire* 33152 (NY). Paratype: woody vine with purple fls, riverine woodland at portage, Raudal Ouraima, Dec. 10, 1951 *Maguire* 32717.

*S. speciosa* is closely related to the widespread *S. diversifolia* (L.) Blake and resembles that species in leaf nervation; the Ouraima species may be differentiated by its glabrous leaf surfaces, somewhat smaller carinal crest, and completely glabrous ovary and ovary wing. In general aspect *S. speciosa* is not unlike *S. marginata* Benth., but the persistent stem pubescence, non-incrassate leaf margins, glabrous ovarial wing, and distinctly cristate keel separate it from that species; the glabrescent branches, smaller leaves, and ecristate keel differentiate *S. retusa* Benth. *S. pendula* Bonpl. (*S. complicata* H.B.K.) differs at least in the pubescent narrower alae and smaller leaves; Bennett in his key in *Flora brasiliensis* cited *S. complicata* as having an ecristate keel, but both the H.B.K. description and type photograph (F13089) indicate the presence of a crest.

#### BEGONIACEAE<sup>14</sup>

The Begoniaceae are so poorly represented in the Guayana Highland that few conclusions can be drawn from their distribution. However, these few species,

<sup>14</sup>By Lyman B. Smith and Bernice G. Schubert.

including the novelty described below, all show affinities toward the north rather than with Brazil.

**Begonia nubicola** Smith & Schubert, sp. nov. (Fig. 65 A.)

Herbacea 1.5-2.5 m alta, omnino glabra; ramis flexuosis, gracilibus, rubris; foliis transversis vel valde obliquis, subellipticis, apice abrupte acuminatis, basi late cordatis, ad 26 cm longis et 11 cm latis margine leviter undulatis, subtus rubro-nervatis, petiolo 4-7 cm longo, stipulis mox deciduis, ignotis; pedunculis axillaribus, ad 9 cm longis; cymis multifloris, valde irregularibus cum ramis alternis elongatis et axin centralem simulantibus, 20 cm longis; bracteis mox deciduis, ignotis; pedicellis masculinis 4-5 mm longis, fructiferis ad 25 mm longis; tepalis masculinis 2, late ovatis, obtusis, basi cordatis, 6 mm longis, roseis; staminibus liberis, antheris oblongis, 0.5 mm longis, quam filamentis subduplo brevioribus, connectivo producto truncato; bracteolis femineis late ovatis, obtusis vel retusis, 5 mm longis, integris, membranaceis; tepalis femineis ignotis; stylis 3, breviter bifidis, ramis stigmatibus spiraliter cinctis, ovario late ellipsoideo, placentis bilamellatis; capsulis inaequaliter trialatis, ala

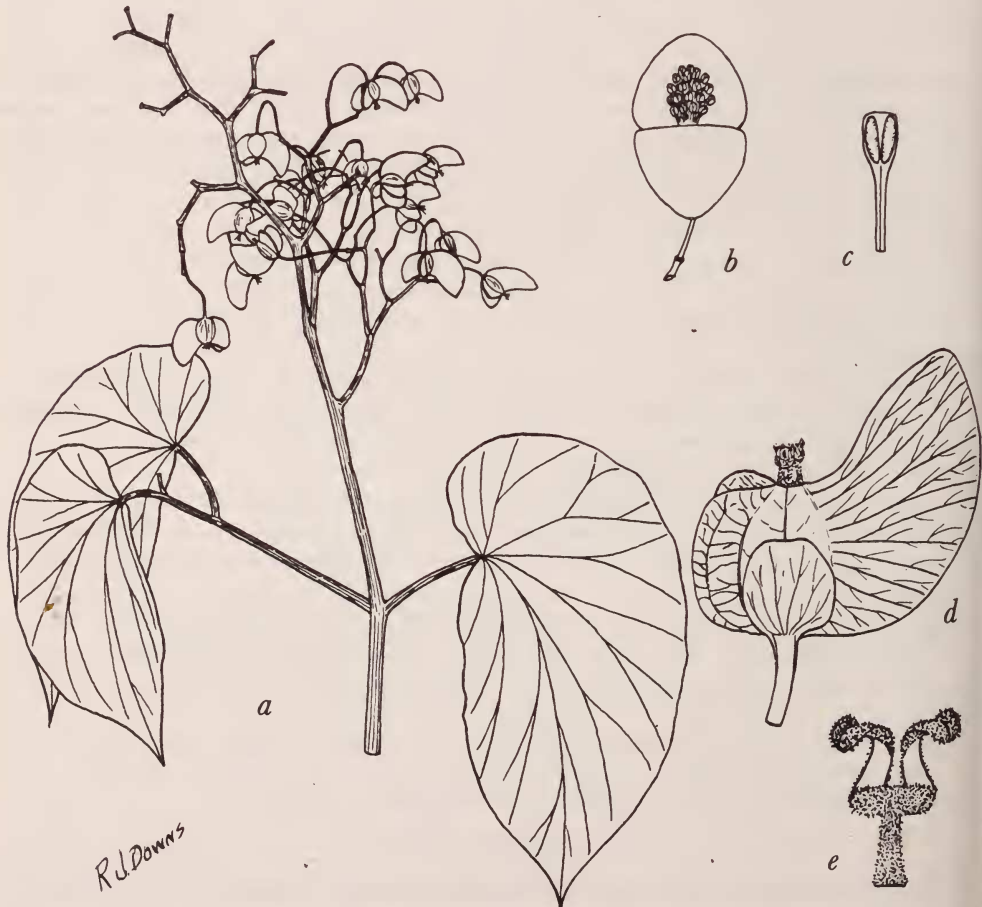


FIG. 65A. *Begonia nubicola* Smith & Schubert. Maguire, Wurdack & Bunting 36859. a, leaves and inflorescence,  $\times \frac{1}{4}$ ; b, staminate flower,  $\times 2$ ; c, stamen,  $\times 10$ ; d, young fruit with bracteole,  $\times 2$ ; e, style,  $\times 10$ .

maxima adscendente dolabriforme, acuta, 20-25 mm alta, duobus ceteris marginiformibus vel semiorbicularibus; seminibus ellipsoideis, reticulatis.

TYPE: Herb 1.5-2.5 m high, leaves red-veined beneath, fruit brown; occasional in high montane forest, 2-8 km [from] Camp No. 3 at 800 m alt., Cerro de la Neblina, Río Yatua, Amazonas, Venezuela, December 24, 1953, B. Maguire, J. J. Wurdack & G. S. Bunting 36859.

We describe this species with some misgiving because of the complete lack of pistillate tepals. On the other hand, the inflorescence has alternating long and short branching which simulates a geniculate central axis and immediately distinguishes this species from almost all others in South America.

#### LYTHRACEAE<sup>15</sup>

The following three new species and *Cuphea cataractarum* Koehne belong to the section *Euandra* subsection *Hyssopocuphea* of Koehne's system of this genus. The species can be distinguished in the following key.

Stems and branches with malpighiaceous hairs only.

Small plants, ± 10 cm in height. Stems slender, branched from the base. *C. rhodocalyx*.

Plants up to 50 cm in height. Stems erect. Inflorescences long with reduced leaves. *C. pleiantha*

Stems and branches with malpighiaceous hairs and other hairs intermixed.

Leaves distichous or subdistichous. *C. distichophylla*.

Leaves decussate. *C. cataractarum*.

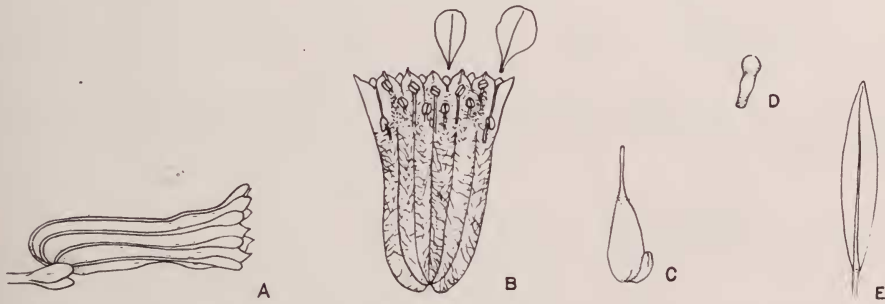


FIG. 66. *Cuphea rhodocalyx* Lourt. A, calyx,  $\times 7$ ; B, the same opened and petals,  $\times 7$ ; C, pistil with the disk,  $\times 7$ ; D, disk,  $\times 10$ ; E, leaf,  $\times 2.5$ . All from Bassett Maguire & Bassett Maguire Jr. 29201.

#### 1. *Cuphea rhodocalyx* Lourt., sp. nov. (Fig. 66.)

Herbacea, parva (ad 9 cm alta). Rhizoma breve, radicibus tenuibus, fibrosis, confertim ramosis. Caules tenues e basi ramosi, procumbentes. Planta tota cum aliquantula pubescentia adpressa, canoso-malpighiacea vestita, glabrescens. Internodia quam folia breviora (2-3 mm). Folia decussata, cauli propter folia sessilia decurrentia aspecta 4-alato. Lamina lineari-lanceolata (5-13  $\times$  1-2 mm), acuta; nervo centrali in utraque pagina conspicuo, margine deorsum replicato. Flores alternati in summo ramorum apice, inter folia. Pedunculi ad 0.5 mm apicem versus duobus bracteolis muniti. Bracteolae magnae, crassae, oblongae aut ovatae, acutae 0.5 mm, plus minusve, longae.

Calyx roseo-lilacinus (2.5 mm longus), in fructu ampullaceus, in fauce dilatatus, calcari obtuso vix conspicuo, appendicibus crassis quam lobuli calycini

<sup>15</sup>By Alicia Lourteig.



brevioribus, obtusis, glaber aut paucissimis pilis adpressi-malpighiaceis vestitus; intus densissime pubescens in nervis et lanato-pubescens a tergo staminum. Petala 6, lilacina, obovato- aut oblongo-spathulata (1.75-1.5 × 0.6 mm), obtusa. Stamina 11, inclusa, perlonga calici aequantia, duobus dorsalibus brevissimis, episepalicis majoribus, tribus ventralibus glabris, caeteris pubescentibus; antherae magnae, ovoideae. Ovarium semiovoideum (1.5 mm) in parte superiori pubescens. Stylus glaber (± 0.5 mm). Stigma capitatum. Discus carnosus, magnus (ca. 0.6 mm), crassus, oblongus, obtusus, erectus. Ovula 4-7.

Semina (immatura) suborbicularia, leviter marginata, foveolata.

TYPUS: VENEZUELA: Territorio Amazonas, Cerro Marahuaca, along streams, montane slopes at 1000 m alt., 9 May 1949, Bassett Maguire & Bassett Maguire Jr. 29201 (NY).

The flowers of this species are very similar to those of *C. dactylophora* with a slight difference in the shape of the disk. On the other hand, its habit is totally different and its pubescence is very slight to almost none.

The name, derived from the Greek, refers to the shade of the calyx.

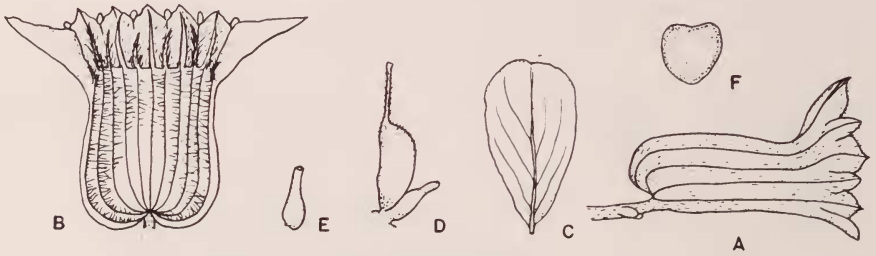


FIG. 67. *Cuphea pleiantha* Lourt. A, calyx, × 5; B, the same opened, × 5; C, petal, × 5; D, pistil with the disk, × 5; E, disk, × 5; F, seed, × 5. All from Bassett Maguire & C. K. Maguire 35126.

## 2. *Cuphea pleiantha* Lourt., sp. nov. (Fig. 67.)

Suffrutex 20-50 cm altus, pubescentia exigua et subtili malpighiacea munitus, plus minusve glabrescens. Rhizoma sublignosum (circiter 1 cm diam.). Caules sublignosi dichotome ramosi; rami ascendentes, rubescentes, valde foliati. Internodia quam folia valde breviora (3-6 mm). Folia decussata, sessilia, lanceolata (12-40 × 2-6 mm), subacuta, nervo centrali in utraque pagina conspicuo, margine deorsum replicato, supra glabra, subtus exigua malpighiacea pubescentia munita. Flores alternati in longis gracillimis inflorescentiis dispositi folia ovato-lanceolata aut oblonga, reducta ad 2-5 × 2 mm gerentes; pedunculi (1-3 mm) crassi, infractiolatibus, glabris aut subglabris, apicem versus duobus bracteolis munitis. Bracteolae rubescentes, crassae, oblongae aut ovatae (0.5-0.6 mm), acutae, paene glabrae.

Calyx (5.5-6 mm) purpureus, cum paucissimis subtilibus malpighiaceis pilis vestitus, tubi plus minusve recti in fauce ampliati, calcari vix conspicuo, obtuso, lobulis dorsalibus majoribus, appendicibus intersepalicis brevioribus, subtiliter ciliatis; intus a tergo staminum lanato-pubescens et infra stamina in nervis dorsalibus subtiliter pubescens et in caeteri nervis inconstanter pubescens. Petala 6, albido-purpurea, oblongo- aut obovato-spathulata (4-5 × 2.5-3 mm), obtusa, interdum aliquot pilos ad basim gerentes. Stamina 11, filamentis latis, duobus dorsalibus brevissimis, episepalicis majoribus, margini calycis aequantia, tribus ventralibus glabris, caeteris lanato-pubescentibus. Pistillum margini calycis aequans et post anthesim ei superans. Ovarium semiovoideo-asymmetri-

cum, subtiliter pubescens, in stylum pubescentem attenuatum. Stigma subcapitatum. Ovula 7-9. Discus crassus, magnus (1.25 mm), ascendens, cylindrico-conicus, obtusus.

Semina 6-9 (inmatura) suborbicularia, complanata, leviter marginata, vix retusa, subtilissime foveolata.

TYPUS: VENEZUELA: Territorio Amazonas, Serranía Yutaje, Río Manapiare, right branch of Caño Yutaje, alt. 1300 m, 9 11 1953, *Bassett Maguire & C. K. Maguire 35126* (NY).

Additional collections: *Maguire & Maguire 35102, 35246, 35376*, all from Serranía Yutaje.

This species is related to *C. dactylophora*, showing a very similar disk. However, there are some differences in the flowers, such as the greater length of the pistil, the fact that the stamens are not strictly included, and the slight hairiness inside the calyx. They differ also in their habit, which in this new species is a very characteristic one with long, conspicuous inflorescences, as well as in the very scanty pubescence on the leaves and the calyx.

The name, derived from the Greek, refers to the long, many-flowered inflorescences.

### 3. *Cuphea distichophylla* Lourt., sp. nov. (Fig. 68.)

Suffrutex ad 30 cm altus. Rhizoma sublignosa. Radices ramosae, fibrosae. Caules erecti vel procumbentes (ad basim usque 4 mm diam.), ramosi, pubescentia canoso-malpighiacea et vix cum pilis glandulosis subtilibus, longis, purpureis, intermixta. Internodia brevissima (1-4 mm). Folia confertissima, disticha, subdisticha aut raro pro parte decussata, ascendentia, rigida, subsessilia, discoloria; petioli valde breves, crassi, purpurei, pubescentes. Lamina lanceolata aut lanceolato-linearis (10-18 × 1.5-3 mm), acuta, nervo centrali lato, subtus conspicuo; margine deorsum replicato. Flores alternati pedunculis infrapetiolaribus (± 2 mm), purpureis, pubescentia simili caulinae munitis, apicem versus duobus bracteolis munitis. Bracteolae ovatae, malpighiaceo- et glanduloso-pubescentes.

Calyx parvus (4.5-5 mm), purpureus, calcar obtuso, valde canoso-malpighiaceo et hispido-purpureo-glanduloso-pubescentis, appendicibus intersepalicis lobulis

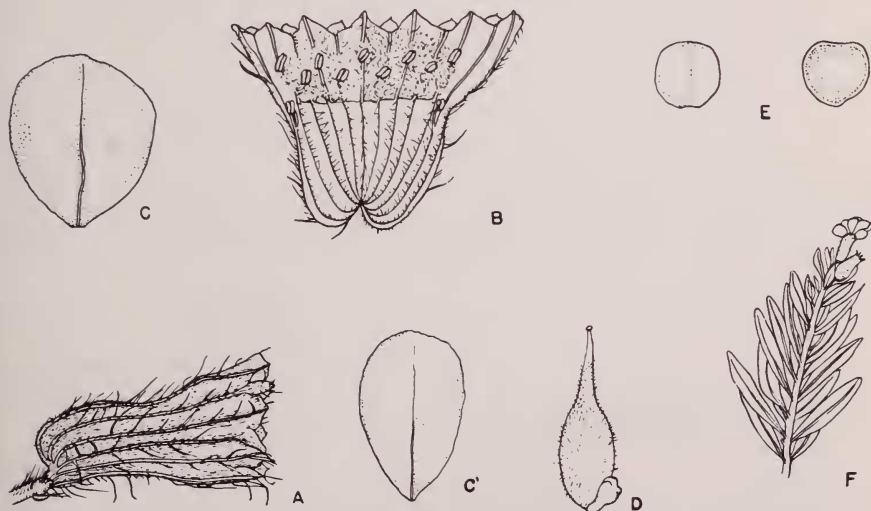


FIG. 68. *Cuphea distichophylla* Lourt. A, calyx, × 5; B, the same opened, × 5; C, dorsal petal, × 5; C', ventral petal, × 5; D, pistil with the disk, × 5; E, seed, dorsal and ventral views, × 5; F, upper part of a branch, × 1. All from *Bassett Maguire 27765*.

similibus, setosis; intus a tergo staminum dense lanato-pubescentibus atque in omnibus nervis. Petala 6, purpurea, obovata aut oblonga, spatulata (3.5-5 × 2-3 mm) interdum nervo centrali pilosa, dorsalia latiora. Stamina 11, inclusa, ad medium longitudinis calycis inserta, duobus dorsalibus brevissimis, episepalicis majoribus, tribus ventralibus glabris, caeteris lanato-pubescentibus. Ovarium semiovoideum, asymmetricum, parvum ( $\pm 1$  mm), pubescens. Ovula 2-3. Stylus crassus, inclusus (1-1.25 mm), pubescens. Stigma subcapitatum. Discus carnosus, crassus, subhorizontalis aut ascendens ( $\pm 0.6$  mm), obscure lobulatus. Semina suborbicularia, castanea (1.5-1.6 mm), leviter marginata, foveolata.

TYPUS: VENEZUELA: Territorio Amazonas, north Savanna, Cerro Sipapo (Paragué), alt. 1400 m, 17 December 1948, *Bassett Maguire & L. Politi 27765* (NY).

Additional collections: *Bassett Maguire & L. Politi 28217, 27646*, also from Cerro Sipapo.

The name, derived from the Greek, refers to the peculiar disposition of the leaves.

#### 4. *Cuphea cataractarum* Koehne.

Río Cunucunuma, Río Orinoco, Terr. Amazonas, Venezuela, *Maguire, Cowan & Wurdack 29496, 30348; Curran 176*. Known only from the region of the Río Cunucunuma.

The stems, leaves, and calyx are all covered with very fine and quite appressed malpighiaceae hairs which are whitish.

#### 7. *Cuphea anisoclada* Lourt., sp. nov. (Fig. 69)

Suffrutex sublignosus (50-60 cm altus), pubescens, glabrescens. Radices ramosae, fibrosae. Rhizoma sublignosum. Caules complures, rufescentes, erecti aut  $\pm$  decumbentes ( $\pm 2$  mm diam., 5 mm ad basim), ad apicem ramosi, pilis canoso-malpighiaceis, ramis valde inaequalibus, plus minusve adpressis, et paucis pilis simplicibus vestiti. Internodia (ad 18 mm longa) quam folia breviora. Folia decussata, subsessilia (petiolis crassis, usque ad 1 mm longis), ascendentia, elliptica aut oblonga (15-23 × 4-7 mm), coriacea, acuta, mucronata, vix cordata, nervis supra conspicuis, centrali subtus prominenti, margine deorsum vix replicato (nunc ciliato); pubescentia in ambobus paginis canoso-malpighiaceae, supra nervo in pagina inferiore copiosior, glabrescens. Flores alternati. Bracteolae ovatae aut suborbiculatae (0.6-1 mm), pubescentes et ciliatae.

Calyx calcaratus (11-12 mm), calcari rotundato, incurvato, fauce paullo ampliato, dense hirsuto-glanduloso- et malpighiaceo-pubescentibus, appendicibus intersepalicis quam lobuli brevioribus; intus a tergo staminum lanato-pubescentibus et infra stamina pubescens in nervis, magis basim versus. Petala 6, lutea (?), oblongo aut obovato-subspathulata (5-6 × 2-2.5 mm) duo ventralia majora ( $\pm 7 \times 3$  mm), obtusa. Stamina 11, duobus dorsalibus brevissimis, inclusa, aut vix calyci

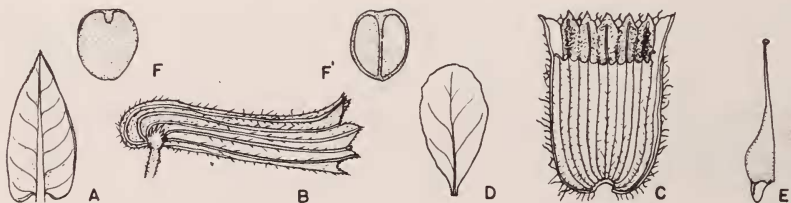


FIG. 69. *Cuphea anisoclada* Lourt. A, leaf,  $\times 1$ ; B, calyx,  $\times 3$ ; C, the same opened,  $\times 2$ ; D, petal,  $\times 3$ ; E, pistil with the disk,  $\times 3$ ; F, seed, dorsal view,  $\times 3$ ; F', the same, ventral view. A-D from *Bassett Maguire 33644*; E-F from *Cardona 1783*.



aequantia, episepalica longiora, e quibus tria ventralia glabra, caetera lanato-pubescentia, intersepalica pubescentia. Discus carnosus, crassus, deflexus. Ovarium ( $\pm 2.5$  mm) semiovoideo-asymmetricum, 3-ovulatum, glabrum in stylum attenuatum. Stylus tenuis, glaber, inclusus ( $\pm 4.5$  mm). Stigma subcapitatum, papillosum. Semina 3, magna ( $\pm 3$  mm), suborbicularia aut subellipsoidea, crassa, carunculata, foveolata.

TYPUS: VENEZUELA: Edo. Bolívar, Gran Sabana, headwaters of Río Aponguaó, alt. 1200 m, 27-28 March 1952, *Bassett Maguire* 33644 (NY).

Additional collections: VENEZUELA: Río Caroni, playas arenosas del raudal Kurukuya, alt. 740 m, *F. Cardona* 1783, 9 X 1946 (US).

In the system of Koehne for this genus, the present new species must be placed in section *Trispermum*, series 3, immediately after *C. flava* Sprengel, from which it differs in the pubescence and the shape of its leaves.

The name, derived from the Greek, refers to the malpighiaceous hairs whose branches are very unequal in length.

#### BIGNONIACEAE<sup>16</sup>

This is my twenty-first contribution to the study of the tropical American representatives of this family. For references to the others, see *Kew Bull.* 1954: 597 (March 1955). In this contribution, the taxa are arranged alphabetically, both by genera and species.

*Anemopaegma parkeri* Sprague.

VENEZUELAN-BRAZILIAN frontier: between Estado Bolívar (Venezuela) and Territorio do Rio Branco (Brazil): shrub 1-2 m tall with cream-white flowers, on rocky knoll on savanna 5 km south-east of Serra Sabang, 720 m, fl. Dec. 1954, *B. Maguire & C. K. Maguire* 40282. Amazonian Brazil, Guiana. Not recorded for Venezuela. This is a habitat form with erect growth.

*Anemopaegma robustum* K. Schum.

VENEZUELA: Territorio de Amazonas: woody vine with sulphur-yellow flowers, along uppermost Río Yatua above mouth of Río Yacibo, 100-140 m, fl. Jan. 1954, *B. Maguire, J. J. Wurdack & G. S. Bunting* 37440. British Guiana. First record for Venezuela.

*Arrabidaea brachypoda* (DC.) Bur.

*A. platyphylla* (Cham.) Bur. et K. Schum., non *A. platyphylla* DC.

VENEZUELA: Bolívar: shrub 0.5-1 m, with pink fls., infrequent in lower slope forest along Fundación Road, 325-415 m, Feb. 27th 1953, *J. J. Wurdack* 34428. Without data, comm. 1926, *Pittier* 12048. These are the first specimens I have seen from Venezuela. This variable species has a wide distribution in South America, from British Guiana to Brazil, Paraguay, Amazonian Bolivia, and Peru.

*Arrabidaea nigrescens* Sandw.

VENEZUELA: Territorio de Amazonas: woody vine on ground, fls. pink, at edge of Sabanita 1 km east of Maroa, Rio Guainía, 125 m, April 16th 1953, *B. Maguire & J. J. Wurdack* 35703.

A form with old, thick, glabrescent leaflets, shining and sub-bullate above, and with relatively few forked hairs on the main nerves beneath. A very similar

<sup>16</sup>By N. Y. Sandwith.

condition is shown by two other collections, *Schultes and Pires* 9114 from the Rio Vaupés, and *Holt and Blake* 595 from the Rio Negro, both localities being in Brazil. This is the first record from Venezuela, the species being known also from British Guiana and Suriname as well as from Amazonian Brazil.

*Arrabidaea trailii* Sprague; Sandwith, Kew Bull. 1953:461. Jan 1954.

VENEZUELA: Bolívar; high-climbing woody vine, spectacular in flower, calyx dull red, corolla deep red, southwestern-facing slopes of Chimantá-tepuí, above valley of Río Tirica, 1000-1700 m, May 16, 1953, *J. A. Steyermark* 75421. Amazonian Brazil. The first record for Venezuela.

A very robust climber with large leaflets and dense trusses of small, deep red corollas. The fruit and seeds may now be described from the material of *Steyermark* 75421 and Herb. Jard. Bot. Rio de Janeiro 35630 (coll. Ducke): *capsule* narrowly elongate-linear, narrowed to the apex, up to 27 cm long, 1-1.2 cm broad, the valves densely minutely lepidote, with somewhat thickened margins and conspicuously raised, thin and sharp, median nerve; *seeds* transversely oblong, 8-9 mm long, 3-4 cm broad, the body dark brownish-lead-coloured, the wings membranous and whitish-hyaline.

*Digomphia densicoma* (Mart. ex DC.) Pilger.

I have by now studied 24 gatherings of this species, which apparently has a wider distribution than *D. laurifolia*, being found at altitudes of from 500 to 2100 m in the Upper Mazaruni River region of the Pakaraima Mts. in British Guiana, in Venezuela (on the tepuís of Estado Bolívar, apparently less common than *D. laurifolia*; on the cerros of Territorio de Amazonas, evidently much more frequent than *D. laurifolia*), and also in northwestern Amazonian Brazil and in Amazonian Colombia where *D. laurifolia* has not yet been collected. As with *D. laurifolia* there is remarkable variation in the size and shape of the leaflets, and in the size of the calyx and capsule. Moreover, the species varies in habit, from a small shrub of 3 ft to a forest tree 50-80 ft high with a trunk 1-1½ ft in diameter. Nevertheless, I am unable to distinguish any of the specimens even as a variety, much less as a distinct species. Variation in the leaflets between individuals from one small area is particularly well shown in the four collections from the Cerro Sipapo (Paráque). Specimens from the eastern end of the range, in British Guiana, have the largest and broadest leaflets, while those at the western end, in Amazonian Colombia, have leaflets of the smallest and narrowest type. The color of the corolla varies from lavender or light pink to white. In my account of this family in Dr. Steyermark's "Contributions to the flora of Venezuela"\* I referred his Ptari-tepuí material to *D. densicoma* with some doubt, but the difficulty of the calyx character is now cleared up by the numerous recent collections from so many localities. The calyx is at first entire, and then splits bilaterally into 2 or sometimes 3 broad lobes. At this stage the pressed calyx sometimes appears spathaceously split down one side only. Later, the two broad lobes become themselves deeply divided, so that eventually there are four subequal lobes. When there are three original lobes, the third of these remains undivided with the result that there are five subequal lobes at the final stage. *D. densicoma*, which is presumably the ancestor of *D. laurifolia*, is always distinguished from it by the pinnate leaves and by the relatively longer and narrower, less elliptic, capsule.

\*Unpublished as this goes to the printer.

*Digomphia laurifolia* Benth.

I have by now seen 22 gatherings of this species, from British Guiana (Roraima and Upper Mazaruni River districts) and Venezuela (tepui's and cerros in Estado Bolívar and Territorio de Amazonas, often locally common), in habitats varying from altitudes of 125 m (Cerro Yapacana, Terr. Amazonas, Venezuela) to 2500 m (summit of Carrao-tepui). There is a good deal of variation in the size and shape of the leaves, sometimes even on the same gathering, in the development of the inflorescence and its indumentum (the pedicels and calyx are usually glabrous, but may be more or less copiously sprinkled with gland-tipped trichomes), and in the size of the calyx and corolla, but I see no reason for distinguishing more than a single species in the material. This is a small shrub with simple leaves and lavender-colored flowers, growing to a height of 15 ft, but usually much smaller and often less than 3 ft high. For further notes on this species, and a description of the capsule and seeds, see my contribution to Dr. Steyermark's "Contributions."

*Distictella monophylla* Sandwith, sp. nov.

Ab omnibus speciebus adhuc cognitis habitu fruticoso haud scandente, foliis simplicibus in forma typica subtus crasse reticulatis aerolis foveolatis pilosulotomentellis statim distinguitur.

*Frutex* ad 3 m altus, virgatus, haud scandens, pauciramosus; rami dense subadpresse pubescentes vel tomentelli; internodia 0.8-3 cm longa. *Folia* simplicia, elliptica, elliptico-oblonga, oblonga, vel elliptico-ovata, apice obtusa vel rotundata, nonnunquam emarginata vel mucronata, basi rotundata vel obtusa, nonnunquam plus minusve cordata, 3-9 cm longa, 1.8-5.7 cm lata, rigide crasse coriacea marginibus revolutis, supra glabra (rarius costa minute pubescenti, pagina sparse pubescenti) nitida punctato-lepidota necnon glandulis patelliformibus immersis prope costam praecipue basin versus praedita creberrime rugosula vel rarius laevia costa nervis venulis planis conspicue reticulatis vel nonnunquam obscuris ac impressis, subtus pilosulo-tomentella nervis venulisque intricatissime reticulatis venulis insigniter crassis nonnunquam glabris aerolas pilosulas velut foveas cingentibus, nervis primariis utroque costae latere vulgo 6-7 sursum arcuatis atque prope marginem anastomosantibus, nonnunquam (in foliis basi cordatis) basi plus minusve quinquenervia vel septinervia; petiolus 3.5-10 mm longus, basi inferne tumido-incrassatus ac in ramum decurrens, indumento ramorum praeditus. *Inflorescentia* apice ramulorum terminalis vel axillaris, racemosa, brevis, ad 5 cm longa, satis pauciflora vel etiam uniflora, passim indumento ramorum praedita; bractee bracteolaeque deciduae, ad 1.5 mm longae; pedicelli circiter 1 cm longi, nonnunquam sub fructu ad 1.5 cm elongati, infra medium vel etiam prope basin bracteolati. *Calyx* more generis campanulatus, apice integer, 4.5-10 mm longus, ad 10 mm latus, tomentellus, consociebus glandularum praeditus. *Corolla* alba, campanulato-infundibuliformis, extra basi cylindrica excepta tomentosa, saepe curvata, 3.5-7 cm longa, tubo apicem versus ad 2.5 cm lato intus sub insertione staminum zona pilorum densissima praedito praeterea supra zonam usque ad apicem papilloso-pubescenti atque glanduloso-lepidoto, limbo 2.5-6 cm diametro lobis intus pubescentibus. *Stamina* glabra, longiora 2.5 cm breviora 1.8 cm longa; antherae divaricatae, 4-4.5 mm longae; staminodium 5 mm longum. *Discus* pulvinatus, 1.5 mm longus. *Ovarium* ellipsoideum, tomentellum, compressum, sulcatum, ovulis pro loculo 4-seriatis; stylus 2.5-3 cm longus, tomentellus, stigmatibus ellipticis ad 6 mm longis atque 3 mm latis. *Capsula* forma generis typica, elliptica vel oblongo-elliptica, apice acumi-



nata, 4-8.5 cm longa, 2-3 cm lata, tomentella, rugosula, glandulis patelliformibus immersis notata, costa valvarum mediana haud vel aliquantum elevata. *Semina* ad 1.5 cm longa, ad 2.7 cm lata, embryone brunnea vel purpurascenti, alis membranaceis subhyalinis pallide brunneis necnon saturatius maculatis.

TYPE: VENEZUELA: Territorio de Amazonas: Cerro Sipapo (Paráque), frequent in savanna, Camp Savanna, 1500 m, fl. and fr. Dec. 15th 1948, *B. Maguire & L. Politi* 27717 (Kew).

VENEZUELA: Amazonas: Cerro Sipapo, on slopes, 1650 m, fl. Dec. 20th 1948, *Maguire & Politi* 27799 (Kew); *ibid.*, 1500 m, fr. Jan. 19th 1949, *Maguire & Politi* 28450 (NY); *ibid.*, Lower Caño Negro, 1400 m, fl. Dec. 25th 1948, *Maguire & Politi* 27898 (NY); Cerro Yapacana, Río Orinoco, frequent in cumbre, 1200 m, fl. and fr. Jan. 3rd 1951, *B. Maguire, R. S. Cowan & J. J. Wurdack* 30662 (Kew); Río Guainía, infrequent in sabana El Venado, left bank of Caño Pimichín above Pimichín, 140 m, fl. April 14th 1953, *B. Maguire & J. J. Wurdack* 35577 (Kew).

COLOMBIA: Río Atabapo: frequent in savanna 1 km west of Cacagual, fl. and fr. Nov. 19th 1953, *B. Maguire, J. J. Wurdack & G. S. Bunting* 36272 (Kew).

*Distictella monophylla* var. *laevis* Sandwith, var. nov.

A planta typica (var. *monophylla*) ramulis glabratibus, foliis utrinque laevibus haud reticulatis subtus glabris crebre punctato-lepidotis differt.

TYPE: VENEZUELA: Territorio de Amazonas: Cerro Yapacana, Río Orinoco, 100-125 m, fl. Jan. 1951, *Maguire, Cowan & Wurdack* 30788 (NY).

Also same data, same collectors 30569 (NY).

This is a very interesting and remarkable species, outstanding in the genus on account of its habit and simple leaves. It will be noticed that the specimens with smooth and glabrous foliage, which I have ventured to treat as a variety *laevis*, came from a locality at a low altitude below the mountains. Nevertheless, the typical var. *monophylla*, with leaves strongly reticulate and hairy beneath, can also occur at low altitudes, as is proved by *Maguire & Wurdack* 35577. I have seen only two, quite poor, specimens of var. *laevis*, and further collections of it may persuade me to revise its status.

*Distictella obovata* Sandwith sp. nov.

*D. cuneifoliae* (DC.) Sandw. atque verosimiliter *D. monophyllae* Sandw. affinis, ab illa foliolis subtus tomentellis nervis lateralibus paucioribus propius ad marginem anastomosantibus, ad hac habitu scandente foliis bifoliolatis nonnunquam cirriferis foliolis plus minusve obovatis venulis subtus minus crasse reticulatis differt.

*Frutex* scandens, ramulis teretibus subadpresse pubescentibus; internodia 3-6 cm longa. *Folia* bifoliolata, nonnunquam cirrho apice trifurcato terminata; petiolus 0.8-1.5 cm longus, pubescens; petioluli 0.6-1.2 cm longi, supra profunde canaliculati, pubescentes; foliola obovata, obovato-elliptica vel oblanceolata, apice obtusa rotundata vel obtuse acuta, basi attenuata acute cuneata, 2.8-9 cm longa, 1.5-4 cm lata, rigide coriacea marginibus revolutis, supra pilis minutis sparsis regulariter pubescentia nitida punctato-lepidota rugosula nonnunquam subbullata costa nervisque planis vel canaliculato-immersis venulis haud cernendis, subtus glaucescentia tomentella costa nervisque prominentibus venulis prominulis intricate reticulatis sed neque valde crassis neque super tomento pilorum elevatis, basi trinervia praeterea nervis primariis utroque costae latere circiter 4 sursum arcuatis atque prope marginem ipsum anastomosantibus. *Inflorescentia* axillaris atque terminalis, racemosa, ad 15 cm longa, laxiflora, ubique pubescens; bractee bracteolaeque deciduae, bracteolae vix 1 mm longae; pedi-

celli 1.3-2.7 cm longi, satis graciles, minute pubescentes, prope medium vel saltem longe supra basin bracteolati. *Calyx* campanulatus, apice integer, 8-9 mm longus, ad 1 cm latus, tomentellus, consociebus glandularum praeditus. *Corolla* alba, campanulato-infundibuliformis, extra basi cylindrica excepta tomentosa, saepe curvata, 4-5 cm longa, tubo apicem versus ad 2 cm lato intus sub insertione staminum zona pilorum papilliformium densissima praedito praeterea supra zonam usque ad apicem papilloso-pubescenti atque glanduloso-lepidoto, limbo 3-4 cm diametro lobis intus pubescentibus. *Stamina* glabra, longiora 2.1 cm breviora 1.7 cm longa; antherae divaricatae, 3.5-4 mm longae; staminodium 5 mm longum. *Discus* pulvinatus, in apicem conico-elevatum contractus, 2 mm altus. *Ovarium* ellipsoideum, tomentellum, compressum, sulcatum, ovulis pro loculo 4-seriatis; stylus tomentellus, superne glabrescens, 3 cm longus. *Capsula* et semina non visa.

TYPE: BRITISH GUIANA: Upper Mazaruni River; Kataima, 500 m, in scrub savanna, fl. Nov. 17th 1951, *B. Maguire & D. B. Fanshawe* 32637 (Kew).

Also same data, same collectors 32637A (NY).

32637 is noted as a vine or bushy rope, with leaves glaucescent beneath, calyx glaucous green, fls. white. This collection shows no tendrils and relatively large and narrower, more or less oblanceolate leaflets, whereas no. 32637A has smaller, obovate leaflets, often accompanied by tendrils.

This material seems to lie between the shrubby simple-leaved species which I have just described and the rarely collected species of Pará and French Guiana, *D. cuneifolia*, for which the necessary new combination was made recently in Kew Bull. 1953:476 (Jan 1954) *D. cuneifolia* was previously outstanding in the genus on account of the shape of its small glabrous, lepidote leaflets. It is obvious that the validity of all these taxa needs testing by extensive field-work. For instance, can *D. monophylla* produce scandent forms with bifoliolate leaves (approximating to *D. obovata*) in the same locality, and can *D. obovata* produce forms with glabrous leaflets and more numerous lateral nerves (approximating to *D. cuneifolia*)? Again, *D. parkeri* (DC.) Sprague & Sandw. and *D. pulverulenta* Sandw. may eventually be regarded as mere indumentum varieties of *D. racemosa* (Bur. & K. Schum.) Urb., which itself may be reduced to *D. magnoliifolia* (H.B.K.) Sandw. It is significant that the floral characters of all these plants seem to be essentially the same, apart from minor differences of measurement, nor does it seem probable that the fruits and seeds will afford good taxonomic distinctions.

#### *Distictella pulverulenta* Sandw.

VENEZUELA: Bolívar: woody high climber, calyx dull lavender, corolla orchid in upper half, whitish below, in rich forest, vicinity of Base Camp, near Río Tirica, lower southwestern slopes of Chimantá-tepuí, 1000 m, May 24 1953, *J. A. Steyermark* 75554. Southern border of British Guiana, French Guiana, and Amazonian Brazil. The first record for Venezuela.

#### *Potamogonos microcalyx* (G. F. W. Mey.) Sandw.

*Micropaegma cupulatum* "(Splitg.)" M. Pichon, Bull. Soc. Bot. Fr. 92:225. 1945.

VENEZUELA: Territorio de Amazonas: liana with purple fls., Río Cuao, Río Orinoco, 125 m, Jan. 1949, *B. Maguire & L. Politi* 28436; vine with purple fls., on rain forest slope, Cerro Huachamacari, Río Cunucunuma, 400 m, Dec. 1950, *B. Maguire, R. S. Cowan & J. J. Wurdack* 29973.

Hitherto known only from British Guiana and Suriname. The fruits and seeds of this genus are still unknown.

M. Pichon's new genus *Micropaegma* is unfortunately abortive, as its type species is *M. "brachycalyx (Klotz.)"* Pichon, based on *Bignonia brachycalyx* Klotzsch = *Anemopaegma brachycalyx* Bur. & K. Schum. That species, as I showed many years ago, in *Rec. Trav. Bot. Néerl.* 34:216, 218 (1937), is conspecific with *Mussatia priurei* (DC.) Bur. ex K. Schum. At the same time (p.222), I showed that *Anemopaegma cupulatum* Bur. & K. Schum., as to their description, was identical with *Potamogonos microcalyx*, its queried basonym, *Bignonia cupulata* Splitg., being a synonym of *Petastoma patelliferum* (Schl.) Miers.

*Pyrostegia dichotoma* Miers ex K. Schum.

VENEZUELA: Territorio de Amazonas: woody vine with bright orange fls., along river near mouth of Caño Manariche, Alto Río Orinoco, 150 m, March 29th 1953, B. Maguire & J. J. Wurdack 34754. Hitherto known only from Amazonian Peru and Brazil.

*Pyrostegia venusta* (Ker-Gawl.) Miers.

VENEZUELA: Bolívar: vine 2-5 m, climbing in shrubs, occasional between Upata and Carhuachi along main highway west of Upata, 150-300 m, fl. and fr. April 29th 1955, J. J. Wurdack & F. W. Wright 406. Brazil, Paraguay, northeastern Argentina, and Bolivia.

Commonly cultivated in many parts of tropical America. Apparently the first record for Venezuela (but planted, or an escape, in this locality?).

*Tabebuia insignis* (Miq.) Sandw. var. *orinocensis* Sandwith, var. nov.

Juxta var. *insignem* atque var. *monophyllum* Sandw. ponenda necnon ulterius comparanda, foliis 1-3-foliolatis, foliolis pro rata satis parvis lateralibus basi sessilibus obliquis inaequilateris junioribus subtus nonnunquam velutino-lanato-tomentosis, capsulis pro rata latis, alis seminum pro rata longis notabilis.

*Shrub*, nearly leafless at the time of flowering. *Leaves*, when 1-foliolate, with a short petiole 1-3 cm long, the lamina attached without an evident petiolule to a joint at the swollen apex of the petiole, elliptic, very shortly broadly obtusely acuminate at the apex, attenuate to the cuneate base, 6-13 cm long, up to 4.5 cm broad, coriaceous, when very young sometimes wooly-tomentose and velvety beneath, copiously lepidote on both surfaces, otherwise glabrous, main lateral nerves about 7 on each side of the midrib, arcuate-ascending; 3-foliolate leaves with petioles 4 cm or more long, and with sessile lateral leaflets which are conspicuously oblique and unequal-sided at the base, the terminal leaflet with a petiolule up to 1.5 cm long, the leaflets with measurements not exceeding those of the 1-foliolate leaves. *Calyx* 1.2-1.7 cm long, about 1 cm broad, unequally and irregularly lobed, more or less lepidote, eglandular. *Corolla* white, the tube and throat yellow within, the hairs on the anterior inner side of the tube short and stiff. *Capsule* rostrate-acuminate at the apex, 10-15 cm long, 1.3-2 cm broad. *Seeds* up to 4 cm broad, the body greyish, the wings membranous, white and hyaline-shining, 1.4-1.7 cm in length (i.e. in relation to the axis of the body).

VENEZUELA: Territorio de Amazonas: locally frequent on *laja* on Isla Raton, Río Orinoco, between Sanariapo and San Fernando de Atabapo, 120 m, fl. and fr. Feb. 1954, B. Maguire, J. J. Wurdack & G. S. Bunting 37701 (Kew).

VENEZUELA: Amazonas: frequent on crystalline *laja* 1-1.5 km east of Hotel Amazonas, Puerto Ayacucho, 100-120 m, fl. and fr. Feb. 1954, Maguire, Wurdack & Bunting 37702; in open scrub savanna on white sand, Cerro Sipapo (Paráque), 200 m, fr. Feb. 1949, B. Maguire & L. Politi 28977 (NY). Bolívar: Río Orinoco, in thin scrub savanna on rounded granite outcrop 10-15 km below La Urbana at Caño Sambolje, 100 m, fl. and fr. March 1949, B. Maguire & B. Maguire Jr. 28993.



This interesting taxon may deserve a higher rank but, for the present, I cannot separate it as more than a distinctive edaphic and perhaps geographic variety of a polymorphic species *T. insignis*, to which I have already reduced *T. longipes* Baker as var. *monophylla*; also suggesting (in Dr. J. A. Steyermark's "Contributions to the Flora of Venezuela") that *T. roraimae* and *T. dura* (Bur. & K. Schum.) Sprague & Sandw. are quite probably habitat and, at least in the instance of *T. roraimae*, altitude forms or varieties of the same species. The unifoliolate leaves of the collection 28993 cited above are velvety-tomentose beneath, while some of those of 37702 are also very distinctly pubescent on the lower surface. Of the material seen by me only the type collection shows both unifoliolate and 3-foliolate leaves, but 37702 is noted on the label as bearing 1-3-foliolate leaves.

*Tabebuia insignis* (Miq.) Sandw. var. *pacimonensis* Sandwith, var. nov.

Inter varietates ceteras foliis brevipetiolatis unifoliolatis rigide coriaceis oblanceolatis, nervis lateralibus supra impressis subtus planis usque ad nervum marginalem rectis nec arcuatis notabilis.

*Sbrub* or small tree. *Leaves* crowded on the very short (1-2 cm) young wood terminating the branchlets, unifoliolate, with petiole 1-1.5 cm long, swollen and jointed at the apex at the junction with the lamina which is oblanceolate, shortly, broadly and obtusely cuspidate-acuminate at the apex, long cuneate-attenuate to the base, 8-13 cm long, 3-4.2 cm broad, stiffly coriaceous with revolute margins, the midrib thin and prominulous above, thick and prominent beneath, the main lateral nerves (7-10 on each side of the midrib) impressed above, flat and obscure on the very smooth-looking, almost veinless lower surface, rather widely spreading-ascending and straight until reaching the marginal connecting nerve, obscurely but definitely lepidote-punctate on both surfaces. *Flowers* white; pedicels 5-7 mm long. *Calyx* up to 1.7 cm long, about 1 cm broad, drying black, irregularly lobed, more or less copiously lepidote outside especially on the lobes. *Corolla* with short and stiff hairs on the anterior inner side of the tube. *Capsule* and seeds absent.

TYPE: VENEZUELA: Territorio de Amazonas: in savanna on right bank of Río Pacimoni 60 km. above its mouth, 100-140 m, fl. Nov. 29th 1953, B. Maguire, J. J. Wurdack & G. S. Bunting 36671 (NY).

This is another very distinct-looking taxon, especially on account of the shape, texture, and nervation of the unifoliolate leaves, but it would be most imprudent, on the evidence of a single collection and in the absence of fruit and seeds, to distinguish it as more than a variety of *T. insignis*.

*Tabebuia stenocalyx* Sprague & Stapf.

FRENCH GUIANA: Tree 7 m tall, flowers white, infrequent in high forest on laterite, Montague de Kaw, 250-270 m, fl. December 14th 1954, R. S. Cowan 38837.

Trinidad, British Guiana. The first record from French Guiana. Not yet recorded from Suriname.

*Tabebuia subtilis* Sprague & Sandw.

VENEZUELA: Bolívar: tree 15 m high, Río Ikabarú, tributary of Río Caroni, 420 m, fl. Oct. 1946, F. Cardona 1728; tree ca. 8 m high, edge of burnt savanna, west side of Uaipán, Uaipán-tepuí, 1400 m, fl. Jan. 1948, K. D. Phelps & C. B. Hitchcock 355 and (without field-notes) 445; tree 40 ft. high, corolla yellow, on Río Abácapa, from mouth to  $\frac{1}{4}$  mile upstream, northwestern part of Abácapa-tepuí, Chimantá Massif, 415 m, fl. fr. March 1953, J. A. Steyermark 74710.

The first records for Venezuela of a species hitherto known (var. *subtilis*)

from riverbanks below the Pakaraima Range in British Guiana and (var. *schultesiana* Sandw. Bot. Mus. Leafl. 17(3):96) from Amazonian Colombia. The collections from the higher altitude, on Uaipán-tepuí, seem to me to be a habitat form or variety with more leathery leaflets which tend to be rounded at the apex with an evanescent cusp or acumen. In the same way, as I have written elsewhere, *T. roraimae* Oliv. and *T. dura* (Bur. & K. Schum.) Sprague & Sandw. are probably montane habitat forms or varieties of *T. insignis* (Miq.) Sandw.

*T. subtilis* seems to be closely allied to *T. guayacan* (Seem.) Hemsl., *T. rufescens* Johnst. and *T. obscura* (Bur. & K. Schum.) Sandw., differing from all of these in the longer hairs along the anterior inner side of the corolla tube, and in the conspicuous and longer bracts of the inflorescence.

#### COMPOSITAE<sup>17</sup>

*Adenostemma pakaraimae* Maguire & Wurdack, sp. nov.

Herba repens, caule radicante cum petiolis pedunculoque modice breviterque crispulo-puberulo pilis articulatis articulis purpureis; foliis oppositis petiolo 8-16 mm longo lamina i.s. membranacea late ovata apice obtusa basi truncata trinervia vel breviter triplinervia nervis supra planis subtus inconspicue elevatis, margine conspicue obtuseque serrata dentibus 1-2 mm altis, supra modice puberula pilis albidis articulatis simplicibus vel ramificatis, subtus in venis venulisque brevissime puberula superficie glabra. Inflorescentia monocephala pedunculo 4-10 cm longo subtus saepius cum bracteis duobus oppositis puberulis ovatis 7-15 mm longis praedito, supra cum bracteolis 1-2 saepius alternis linearibus puberulis; capitulo nutanti, involucri squamis 2-seriatis lineari-oblongis obtusis vel hebeti-acutis, 4-6 × 1-1.5 mm, extus puberulis conspicue crispulociliolatis intus glabris; floribus ca. 13-15; corollae tubo cylindrico (basi leviter expanso) 5.3 mm longo sparse puberulo lobis 5 triangularibus 1.6-1.8 mm longis; antheris 2 mm longis in tubo circum stylum coalitis, filamentis 2 mm longis apice per 0.5 mm incrassatis circa basim corollae insertis; stylo 5 mm longo ramis linearibus 5.5-6 mm longis; pappi setis 4, clavatis, 1 mm longis; achaeniis immaturis 3-5 mm longis ad costas puberulis inter costas sparsissime glandulosis.

TYPE: repent succulent herb, occasional on forested slopes of Mt. Ayan-ganna, British Guiana, elev. 1000-1500 m, Feb. 5-6, 1955, *Maguire, Bagshaw & Maguire* 40578 (NY).

*A. pakaraimae* is most closely related to *A. verbesina* (L.) Kuntze; this Antillean and Brazilian species may be differentiated by the glabrous or evanescently puberulous leaves, several-headed inflorescences, glabrous to very obscurely involucre bracts, and more numerous flowered capitula.

*Eupatorium memorabile* Maguire & Wurdack, sp. nov.

Frutex pauciramosus; caulibus vel ramis teretibus robustis juventate dense villosis indumento demum fusco-brunneo tarde glabratis internodiis 1-5 cm longis; foliis oppositis ovatis crasse coriaceis acutis minute apiculatis vel obtusis margine integro anguste recurvato pennivenis jugis 6-8, venis venulisque supra obscure elevatis subtus prominenter elevatis laxe reticulatisque, supra papilloso-scabridis papillis 1-3 in mm quadr. quoque, subtus in venis venulisque villosulis superficie glabris dense (7-9/mm<sup>2</sup>) glanduloso-punctatisque 6-13 × 3-8 cm; petiolo 0.7-2.5 cm longo robusto pubescentia ramorum eadem; corymbo

<sup>17</sup>Several taxa have been contributed by L. Aristeguieta, Inst. Botánico, Caracas, Venezuela, and *Senecio phelpsiae* by J. Cuatrecasas.

terminali di- vel trichotomo denso; capitulis congestis sessilibus 10-11 × 3.5 mm, 8-9-floris; involucri subcylindrici squamis ca. 25, 3-4-seriatis apicem versus purpureo-tinctis regulariter gradatis, intimis oblongis, obtusis, vel breviter acutis, 6.5-7 × 1.1-1.5 mm, glabris, trinerviis, extimis ovatis, 3.5-4 × 1.5-1.8 mm, apicem versus extus parce glanduloso-puberulis, trinerviis; receptaculo convexo glabro vel paucisetuloso; corollis glabris graciliter tubulosis gradatim ampliatis, tubo 4.9 × 0.6 (basi)-0.9 (apice) mm, lobis 0.4 × 0.3 mm; styli ramis longe exsertis flexuoso-recurvatis, 4.5-5.5 mm longis; achaeniis glabris 2.6 mm longis, 5-angulatis; pappi setis ca. 50, barbellatis apicem versus paulo incrassatis plerumque corollae aequantibus vel parce superantibus 5.4 mm longis, sordido-albidis, basi vix coalitis.

TYPE: shrub 0.7-1.5 m, fls pale lilac, frequent along escarpment overlooking Cano Grande near Cumbre Camp, elev. 1650 m, Cerro de la Neblina, Terr. Amazonas, Venezuela, Jan. 10, 1954, *Maguire, Wurdack, & Bunting* 37210 (NY). Paratypes: upper part of escarpment face above Camp 3, Cerro de la Neblina, elev. 1500-1700 m, Dec. 27, 1953, *Maguire, Wurdack, & Bunting* 36959; scrub forest near Cumbre Camp, Cerro de la Neblina, elev. 1700 m, Jan. 4, 1954, *Maguire, Wurdack & Bunting* 37039; cumbre along west escarpment, Cerro de la Neblina, elev. 1700-1800 m, Jan. 6, 1954, *Maguire, Wurdack, & Bunting* 37070.

In general vegetative aspect, *E. memorabile* is reminiscent of the many coriaceous-leaved Andean species of Sect. Subimbricata, such as *E. jabnii*. The inflorescence aspect is like that of *E. phoenicticum* Rob. (sect. *Hebeclinium*). The convex receptacle would place the Neblina species in sect. *Conoclinium* (disregarding the very few fugacious spicules). Within the genus *Eupatorium*, however, only *E. roupaliifolium* Rob. can be ascribed as even a distant floral-character relative of *E. memorabile*, having the same (albeit much smaller) general capitular characters; the pubescence and leaf characters readily separate the two species.

***Eupatorium bulbosum* Aristeguieta, sp. nov.**

Herba perennis erecta 15-30 cm alta, basi bulbosa, ramis juventate pilosis tardius glabratis. Foliis radicalibus suboppositis petiolatis ovatis apice obtusis vel rotundatis basi rotundatis vel subobtusis, 5-9 cm longis, 2.5-5 cm latis, crenato-dentatis membranaceis utrinque sparse pubescentibus penniveniis; petiolo 2.5-4.5 cm longo. Corymbis terminalibus compositis. Capitulis ca. 24-floris, 5 mm altis, 3 mm diametro; pedicellis 2-4 mm longis. Involucri cylindrici squamis 4.5 mm longis, 4-seriatis imbricatis, oblongo-lanceolatis, obtusis, vel subacutis, glabratis. Receptaculo convexo. Corollis 2.8 mm longis, glabris. Achaeniis 1.5 mm longis, scabratis, Pappi setis albis, 2.2 mm longis.

TYPE: root tuberous, flowers white, locally frequent on talus slopes, Cerro Paru, alt. 1500 m, Territorio Amazonas, Venezuela, Feb. 13, 1951 *Richard S. Cowan & John J. Wurdack* 31446 (NY).

This new acaulescent species with a tuber-like rootstalk presents a habit very rare in the genus *Eupatorium*. However, its floral characters are those of *Eupatorium* and it seems to be related with *E. penninervatum* Wurdack, recently described from Cerro Sipapo.

***Eupatorium morichalanum* Aristeguieta, sp. nov.**

Suffrutex 1-1.5 m altus, ramosus, caulibus teretibus griseo-pubescentibus. Foliis alternis saepe in axillis proliferis, ovatis vel rhomboideo-ovatis, apice subacutis basi subtruncatis, 4-6.5 cm longis, 2-3 cm latis, serratis, membranaceis, supra pubescentibus subtus punctatis pubescentibus, 3-nervatis; petiolo 5-12 mm longo. Corymbis terminalibus subdensis. Capitulis 20-25 floris, 6 mm



altis 5-6 mm diametro; pedicellis pubescentibus brevibus, 1-5 mm longis. Involucri campanulati squamis 2-seriatis subaequalibus lineari-lanceolatis acutis, 4.5-5.2 mm longis, dorso puberulis. Receptaculo leviter convexo. Corollis albis, 3.2-3.8 mm longis, glabris. Achaeniis 2 mm longis puberulis vel glabris cum glandulis sessilibus. Pappi setis corollae subaequantibus.

TYPE: locally frequent at margin of morichal 1-4 km above Salto de Humito, Río Villacoa (Río Auyacoa) 25-30 km from mouth, elev. 130-140 m, Edo. Bolívar, Venezuela, Jan. 7, 1956, *John J. Wurdack & J. V. Monachino 41157* (NY).

This species is closely related to *E. ballotae-folium* H. B. K. In *E. ballotae-folium* the flowers are violet with pubescent non-glandular achenes, whereas the new species has larger leaves and white flowers with glabrescent achenes covered with sessile glands.

***Mikania neblinensis* Aristeguieta, sp. nov.**

Frutex volubilis, caulibus teretibus dense ferrugineo-sericeis. Foliis oppositis petiolatis ovatis apice acutis basi rotundatis, 6-7 cm longis, 3.5-4.5 cm latis, supra scabris subtus dense sericeo-ferrugineis, obscure denticulatis revolutis subcoriaceis penniveniis; petiolo ferrugineo-sericeo, 1-1.5 cm longo. Paniculis terminalibus. Capitulis ca. 1 cm altis; pedicellis 2-4 mm longis. Bracteis oblongo-lanceolatis, 6-6.5 mm longis, apice obtusis vel rotundatis dorso dense pubescentibus; bracteolis oblongo-lanceolatis, 3.5 mm longis, pubescentibus. Corollis 6.5 mm longis, limbo hispidis aliter glabris; tubo proprio 2.5 mm longo; dentibus limbi 1.2 mm longis. Achaeniis 4-4.5 mm longis, sparse puberulis. Pappi setis 6.5-7 mm longis.

TYPE: vine 1-2 m long in low shrubs, infrequent along west escarpment 8 km north of cumbre camp, 1850-1900 m elev., Cerro de la Neblina, Territorio Amazonas, Venezuela, Jan. 10, 1954, *Bassett Maguire, John J. Wurdack, & G. S. Bunting 37191* (NY).

*M. neblinensis* is related with *M. pannosa* Baker from which it differs by its sericeo-pilose indument covering the young branches and lower leaf surfaces, leaves rounded at the base, and a shorter involucre. *M. pannosa* has long-lanuginose indument and leaves cordate at the base.

***Baccharis brachylaenoides* DC. var. *ligustrina* (DC.) Maguire & Wurdack, stat. nov.**

*B. ligustrina* DC. Prodr. 5: 421. 1836.

*B. vitis-idaea* Oliver. Trans. Linn. Soc. Bot. II, 2: 277. 1887.

*B. roraimae* Schomb. Fauna & Fl. Guy. 1078. 1848. Nomen nudum.

*B. ptariensis* Steyermark, Fieldiana Bot. 28: 624. 1953.

DeCandolle described simultaneously *B. brachylaenoides*, *B. venulosa*, and *B. ligustrina*. Baker (in Mart. Fl. Bras. 6<sup>3</sup> I: 82. 1884) synonymized *B. venulosa* under *B. brachylaenoides*, although he apparently did not see the Haenke specimen upon which *B. venulosa* was based; the photograph of the type material (F8178) indicates that Baker was correct, as do subsequent Peruvian collections (*Killip & Smith 25704, Spruce 4333*). Subsequent authors of varieties of *B. venulosa* (*Hieronymus, Cuatrecasas, Steyermark*) without explanation did not follow Baker's interpretation; isotypes of *B. venulosa* var. *cuspidibracteata* Steyermark and *B. venulosa* var. *oblanceolata* Hieron. have been examined by us and are certainly conspecific with *B. brachylaenoides*; whether they are sufficiently distinct to be varieties is not germane to the present discussion. Typical var. *brachylaenoides* has large broadly oblanceolate acute to shortly acuminate leaves and a well-developed large panicle. Typical var. *ligustrina* has small, narrowly to broadly oblanceolate obtuse, apiculate, often 1-3-mucronulate leaves,

smaller stature, less well developed panicles, and fewer flowers per head (10-15 rather than 12-25). Many geographically uncoordinated intermediates exist; even the more typical specimens show little geographical correlation. Typical var. *brachylaenoides* is represented by Riddel 575, Glaziou 11047, 6610, Gardner 490, 778, all from southeastern Brazil; Schomburgk 1014, Maguire & Maguire 35084, 35179, 35359, 35447 from Venezuela; and the previously mentioned Peruvian collections. Collections with varying degrees of intermediacy toward var. *ligustrina* are: Gardner 4915, Miers 3624, Glaziou 11111, 11114, from southeastern Brazil; Rusby 1490, Williams 1454, Buchtien 258, Rusby 1579 from Bolivia; and Phelps & Hitchcock 446, Cardona 1976 from Venezuela. More or less typical var. *ligustrina* is represented by: Riedel III/73 and Glaziou 15088 from southeastern Brazil; Tate 285 from Bolivia; Steyermark 58725, 59928, 60123, Steyermark & Wurdack 337, 338, 339, 340, 773, Phelps & Hitchcock 398, Maguire & Maguire 40439, Steyermark 74892, 75872, Maguire, Wurdack, & Bunting 37114, 37297, 37313, Pinkus 110, Steyermark 58796, Quelch & McConnell 91, and Tate 399, all from southern Venezuela and adjoining Brazil. The quantitative characters used to distinguish *B. ptariensis* from *B. vitis-idaea* have no significance; the degree of inflorescence-development varies greatly within the series Steyermark & Wurdack 337-340, all collected within a very small area on Chimantá-tepuí. It is believed that the robust plants of var. *brachylaenoides* represent a response to a sheltered environment as contrasted to the usually open areas in which the diminutive plants of var. *ligustrina* grow, at least in the Pacaraima cumbres. This study has been supplemented by a generous loan of the Kew material of the taxa concerned.

***Aspilia rubra* Aristeguieta, sp. nov.**

Suffrutex caulibus simplicibus, erectis, usque ad 1 m altis, sparse adpresse pilosis. Foliis oppositis brevipetiolatis lineari-lanceolatis apice acuminatis basi obtusis vel rotundatis, 8-15 cm longis, 1.2-2.2 cm. latis, utrinque sparse adpresse pilosis, denticulatis firme chartaceo-membranaceis penniveniis; petiolo 2-3 mm longo. Capitulis 1 vel 2, terminalibus in pedunculis 2-8 cm longis; disco 12-15 mm diametro. Involucri campanulati 2-seriati, 10-15 mm alti, phyllariis inaequalibus (exterioribus longioribus) lanceolatis acutis herbaceis strigillosis, interioribus similibus brevioribus, Radiis rubris ca. 10, neutralibus, oblongis, dorso in nervis breviter pilosis, 11-12 mm longis, 3.5-4 mm latis; flosculis disci glabris 4 mm longis. Achaeniis 4 mm longis sparse puberulis vel glabris, maturis rugoso-tuberculatis. Pappi corona 0.5 mm longa.

HOLOTYPE: herb 0.3-1 m, rays 11-12 orange-red, disc flowers orange, occasional at savanna edge between Puerto Ayacucho and Sanariapo, elev. 100-120 m, Territorio Amazonas, Venezuela, Nov. 11, 1953, Bassett Maguire, John J. Wurdack, & George S. Bunting 36147 (NY). Paratype: Carretera Puerto Ayacucho hacia la Boca del Río Sanariapo, alt. 120 m, Territorio Amazonas, Venezuela, May, 1940, Llewelyn Williams 13078, Instituto Botánico, Caracas, Venezuela.

*A. rubra* is characterized by its red flowers which are very exceptional in the genus.

***Verbesina schomburgkii* Schultz-Bip. ex Klatt subsp. ligulata Maguire & Wurdack, subsp. nov.**

Capitula ligulata; ligulis 5-10 ellipticis vel ovato-ellipticis apice 3-lobulatis; lamina 9-12.5 × 4-4.5 mm; tubo 1.5-2 mm longo.

HOLOTYPE: Slender tree 3-6 m tall, ligules and disk fls yellow, locally common in intervalles, drainage of main branch, Cano Yutaje, Cerro Yutaje,

Terr. Amazonas, Venezuela, elev. 1500 m, Feb. 17-19, 1953, *Maguire & Maguire* 35283 (NY). Paratypes: Shrub or small tree 2-3 m tall, ligules 8-10 yellow, infrequent on rocky slopes along middle section, main branch, lefthand fork of Cano Yutaje, Cerro Yutaje, elev. 1300-1400 m, Feb. 15, 1953, *Maguire & Maguire* 35239; slender tree 3-5 m tall, ligules yellow, frequent in cumbre of Cerro Corocoro, Terr. Amazonas, Venezuela, elev. 1500 m, Mar. 2, 1953, *Maguire & Maguire* 35429; virgate shrub to 5 m, rays 5-7 yellow, occasional in opening in cloud forest below Tower Escarpment, Ilu-tepuí, Edo. Bolívar, Venezuela, elev. 1900 m, Mar. 11, 1952, *Maguire* 33372; shrub 4 m tall, rays yellow, frequent on montane slopes between Camp 2 and base of escarpment, Ilu-tepuí, elev. 1900-2100 m, Mar. 16, 1952, *Maguire* 33452; shrub 10-12 ft tall, rays and disc florets yellow, lower mixed *Bonnetia* forest above southeast-facing upper shoulder on slope leading to summit of Apacara-tepuí, Chimantá Massif, Edo. Bolívar, Venezuela, elev. 2000-2150 m, June 20, 1953, *Steyermark* 75812.

*Steyermark* (*Fieldiana Bot.* 28: 676. 1953) discussed the probable synonymy of *V. schomburgkii* and *V. guianensis* Baker; we have confirmed this by examination of *Schomburgk* 654/993 and 194S, kindly lent by Kew. The typical eligulate subspecies has also been collected, apart from *Steyermark's* topotypical 58670, on Serra do Sol (*Maguire & Maguire* 40447), where the field notes indicate a completely eligulate population. The ligulate and disc achenes seem to show no differences so old-flowering or fruiting material, such as *Steyermark & Wurdack* 985 from Chimantá, cannot surely be placed; the geographic analogy would place all Chimantá collections in subsp. *ligulata*.

*V. pilosa* *Maguire & Wurdack*, a ligulate species to be based on *Phelps & Hitchcock* 424 from Uaipán-tepuí and also represented by *Cardona* 2628 from Auyán-tepuí, is closely related to *V. schomburgkii* but has much denser lower leaf surface pubescence, persistently pubescent upper leaf surfaces, and densely pubescent involucral bracts which are all approximately the same length. *Steyermark* 60070, from Soropán-tepuí, has rayed capitula, with leaves more pubescent than usual for *V. schomburgkii* subsp. *ligulata*; while suggestive of *V. pilosa*, this specimen seems best assigned to *V. schomburgkii* subsp. *ligulata* because of the gradate sparsely puberulent bracts.

In revising *Verbesina* sect. *Lipactinia* (*Am. Jour. Bot.* 12: 625-640. 1925), Blake noted that some species, such as *V. arborea* and its allies, may occasionally or always have a few small rays; probably the entire genus must be re-evaluated in light of the lesser importance of the presence or absence of rays. Head size likewise seems to be a rather tenuous character, with floret counts in collections of *V. schomburgkii* subsp. *ligulata* from Yutaje ranging from 20 to 45. *V. glabrata* H. & A. is very closely related to *V. schomburgkii* and *V. pilosa*; the Brazilian species differs from both in its thinner leaves and longer pedicels. *V. pilosa* also differs from *V. glabrata* in its non-gradate phyllaries, and *V. schomburgkii* has proportionately wider, more or less obovate, short-acuminate leaves.

*Calea cardonae* *Maguire & Wurdack*, *Mem. N. Y. Bot. Gard.* 8: 146 (1953) var. *cardonae*.

TYPE: Acopán-tepuí, Guayana, Venezuela, *F. Cardona* 2274 (US).

The typical form of *C. cardonae* as known at this time is confined to the Chimantá massif.

*Calea cardonae* var. *orientalis* *Maguire & Wurdack*, var. nov.

A var. *cardonae* similis, sed laminae foliorum firme chartaceis, anguste vel late ellipticis, 2-4(5) cm longis, 10-18(25) mm latis.



TYPE: shrub 1-1.5 m high, rays yellow, occasional, open slopes at 2400 m alt., Ilu-tepuí, Edo. Bolívar, Venezuela, March 20, 1952, *Bassett Maguire* 33523 (NY). Paratypes: shrub 2 m high, scrub savanna at 1100 m alt., Holi-tipu, British Guiana, November 10, 1951, *Maguire & Fanshawe* 32529; Ilu-tepuí at 2300 m alt., *Maguire* 33540; shrub 2 m high, small "bush islands," savannas between Chi-Chi and Chinowieng at 1000 m alt., February 10, 1955, *Maguire, Bagnshaw & Maguire* 40648 (intermediate to var. *cardonae*).

The variant with paler, firmer, and smaller leaves seems to be confined to the eastern part of Guayana in Venezuela and adjacent British Guiana.

*Calea divaricata* Benth. Jour. Bot. Hook. 2: 44 (1840) var. *divaricata*.

*Calea suffruticosa* Maguire & Wurdack, Mem. N. Y. Bot. Gard. 8: 149. 1953.

TYPE: Richard Schomburgk, "near the Roraima Mountain" [Venezuela], Kew.

Generally distributed on open areas, Gran Sabana, Venezuela, and Ayanganna Savanna, British Guiana.

*Calea divaricata* var. *diffusa* Maguire & Wurdack, var. nov.

Suffrutex diffusus, 5-6 dm altus; laminis ca. 1 cm longis; pedunculis 1.0-1.5 cm longis; capitulis radiatis, parvis, 6 mm altis, floribus ligulatis 3-4, floribus disci 8-10, corollis ca. 3.5 mm longis; achaeniis ca. 2 mm longis, squamulis oblanceolatis, obtusis, ca. 1.5 mm longis.

TYPE: diffuse shrub 6 dm high, rays 3-4, yellow, rare but forming colonies associated with No. 33298 (*C. divaricata* var. *divaricata*), Kamarang Head, Gran Sabana, Estado Bolívar, Venezuela, at 800-950 m alt., March 6, 1952 (NY).

Strikingly distinct in the field by virtue of its reduced stature, more diffuse habit and smaller floral and vegetative parts, this variant maintains discrete colonies within populations of var. *divaricata*.

*C. divaricata* is used by Arecuna Indians as a medicinal plant.

*Calea linearifolia* Maguire & Wurdack, sp. nov. (Fig. 70)

Frutex suffruticosus 3-15 dm altus; ramulis tenuibus acute sulcate angulatis, inter angulos scabrido-hirsutulis; foliis oppositis, laminis lineari-oblongis vel lineari-oblanceolatis, (1.5)2-3 cm longis, 1.5-3(5) mm latis, glabris, coriaceis, subtus punctatis, firme nervatis, venis prominentibus, valde margini-nervatis, apice obtuso, basi angusta, sine petiolo manifesto; inflorescentiis terminalibus, capitulis 1-2, bracteis subtendentibus fere 2-jugis lineari-lanceolatis, glabris, punctatis, 7-8 mm longis, capitulos excedentibus; pedunculis 2-3 cm longis, glabris, valde sulcate angulatis; phyllariis 3-seriatis, oblongo-lanceolatis, obtusis 3-5 mm longis, glabris, vittatis; paleis ca. 5 mm longis, obtusis; floribus ligulatis probabiliter deficientibus, floribus discoideis 5-10 hypocrateriformibus, ca. 4 mm longis; achaeniis albidis, 4-angulatis, ca. 2 mm longis, glabris, sparse ciliolatis angulis exceptis; pappo ca. 3 mm longis, squamulis 12-15, 2-seriatis, scariosis, lineari-acuminatis.

TYPE: shrub 0.3-1.0 m high, in old fruit, occasional, cumbre sabanita, head of camp stream at 2000 m alt., Cerro Parú, Terr. Amazonas, Venezuela, February 2, 1951, *Cowan & Wurdack* 31178 (NY). Paratype: suffruticose shrub 0.5-1.5 m high, western rim Cerro Parú at 2000 m alt., February 4, 1951, *Cowan & Wurdack* 31219.

A most distinct species, known only from the cumbre of Cerro Parú. This small shrub is probably a derivative of *C. abelioides*, the more widespread Highland species south of the Ventuari River.

*Calea lucida* Maguire & Wurdack, sp. nov. (Fig. 70.)

Frutex ramosus 4-8 dm altus; ramulis purpureellis, valde sulcate angulatis,

sparse strigose hirsutulis, trichomatibus sursum appressis; foliis oppositis, laminis 3.0-4.5 cm longis, 2.2-3.5 cm latis, orbicularibus, late ellipticis vel late ovatis vel obovatis, lucidis, glabris (juvenilibus persparse puberulis), crenulato-dentatis, integris subter medio, apice acuto, basi acutiuscula vel subcuneata; primo jugis duobus venarum lateralium supra recurvis prominentioribus, venis reticulatis, supra prominulis, subter prominentibus; petiolo 3-5 mm longo; capitulis solitariis terminalibus majusculis hemisphaericis, multifloris, radiatis; pedunculis 3-5 cm longis; bracteis subtendentibus 2-jugis, foliaribus, glabris, ovatis, acutiusculis, 5-8 mm longis; phyllariis 3-seriatis, exterioribus late orbicularibus oblongis, ca. 8 mm latis, 10 mm longis, corpore indurato, marginibus scariosis, interioribus ca. 12 mm longis, angustioribus sed plus late scario-marginatis; floribus ligulatis plus 12; floribus disci pernumerosis, 75-100, paleis subtendentibus conduplicatis naviculiformibus, oblongo-obovatis, apice rotundato vel late obtuso, eroso, ca. 8 mm longo; corollis 5-6 mm longis, lobis ca. 1.5 mm longis; achaeniis 2.25-2.50 mm longis, prismaticis, 5-angulatis, ad basim angustatis glabris; pappo 2-seriato, squamulis ca. 15-18, 5-6 mm longis, lanceolatis, attenuato-aristatis, aliquando 2-3-partitis ad apicem.

TYPE: shrub 4-8 dm high, radiate, but ligulate flowers post-mature and lost, occasional in scrub bush, Mesa Ridge at 2000 m alt., Cerro Ilu-tepuí, Guayana, Venezuela, March 23, 1952, *Maguire 33550* (NY). Known only from the cumbre of Ilu-tepuí.

*Calea lucida* is to be interpreted as derived from the polymorphic *C. lucidivenia*. The Ilu-tepuí plant has solitary massive heads with 75-100 florets, and suborbicular leaves. Both of these are mere quantitative expressions of characters variable in *C. lucidivenia*, but form and induration, and lack of vittation of the involucre bracts of *C. lucida* are strikingly distinctive from those of *C. lucidivenia*, which are strongly vittate.

*Calea orbiculata* Maguire & Aristeguieta, sp. nov.

Frutex virgatus vel pauciramosus 1-2 m altus; ramulis conspicue sulcatis, glabris vel sparse glandulosis vel sparse strigoso-puberulis; foliis oppositis, sessilibus vel petiolo brevissimo, 1 mm vel minus longo; laminis orbicularibus vel perlate ellipticis, coriaceis glabris supra lucidis, subtus sparse vel moderate glanduloso-punctatis, valde pinninervatis, 6-8 jugis, valde reticulatis, margine subintegra vel minute denticulato-crenulata; capitulis 1, saepe 2-3, hemisphaericis vel late campanulatis, ca. 20 mm latis; pedunculis 3-4 cm longis, minute puberulis; bracteis subtendentibus 1-2-jugis, foliaceis, 6-10 mm longis, 6-8 mm latis, late ovatis obtusis navicularibus valde 9-11-nervatis, praecipue glabris, scario-marginatis; phyllariis 3-4-seriatis oblongis vel oblongo-ellipticis 12-18 mm longis, membranaceis, valde vittatis, scarioso-marginatis, minute ciliolatis; paleis conduplicatis, lanceolatis, ciliolatis 8-9 mm longis; floribus ligulatis 12-15, ligulis lineari-oblongis, 18-20 mm longis, 3-6 mm latis; floribus discoideis pernumerosis; corollis 8-9 mm longis glabris, tubo 3-4 mm longo, lobis triangularibus ca. 1 mm longis; achaeniis glabris, acute 4-angulatis; pappo squamoso, squamulis 4-5, eroso-scariosis, inaequaliter truncatis vel obtusiusculis, 0.5-1.5 mm longis, uno solo lanceolato, acutissimo serrulato, 2.0-3.0 mm. longo.

TYPE: virgate or little-branched slender shrub 1.0-1.5 m high, ligules yellow, rocky places in scrub savanna at 1350 m alt., Left Fork Caño Yutaje, Cerro Yutaje, Río Manapiare, Amazonas, Venezuela, Feb. 12, 1953 *Bassett & Celia K, Maguire 35197* (NY). Paratypes, Serranía Yutaje, *Maguire & Maguire* (Cerro Yutaje) 35128; (Cerro Coro-Coro) 35448.

*Calea orbiculata*, confined to Serranía Yutaje, is most closely related to *C. phelpsiæ* which was collected on the nearby Cerro Yaví. The first has orbicular minutely denticulate sessile leaves which are totally glabrous. *C. phelpsiæ* has ovate or elliptic, crenate-serrate leaves which are sparingly but obviously strigulose beneath, and are distinctly petiolate.

*Calea punctata* Maguire & Wurdack, sp. nov. (Fig. 70.)

Frutex moderate ramosus 1-3 m altus; ramulis 2-3 mm diam., sulcatis, primum tenus subpannoso-tomentosis, demum puberulis; foliis oppositis, laminis coriaceis, (2.5) 3-4 cm longis, (1.5) 2-4 (4.3) cm latis, orbiculatis a late ovatis, apice rotundato vel late obtuso, basi subcordata, truncata vel late obtusa, crasse crenatis, 3-5-plinervatis, venis prominentibus superficiebus amobobus, glabris, conspicuis puberulo-punctatis; petiolis 3-6 mm longis; capitulis terminalibus, majusculis, hemisphaericis, solitariis (vel aliquando 1-2 minoribus subterminalibus); bracteis subtendentibus 6-8 foliaribus ovatis ellipticis vel suborbicularibus, 6-10(18) mm longis; pedunculis 1-3 cm longis; phyllariis 2-3-seriatis, subaequalibus membranaceis, vittatis, late oblongis, 10-12 mm longis, late scario-marginatis; floribus ligulatis 20-25, ligulis linear-oblongis, ca. 15 mm longis, luteis lucidis; floribus disci pernumeris plus 100; paleis subtendentibus ca. 8 mm longis, induratis, valde 5-nervatis, erose 3-dentatis, lobo medio aristato 2 mm longo; corollis hypercrateriformibus, 5.5-6.0 mm longis, glabris; achaeniis prismaticis 4 (5)-angulatis ca. 3 mm longis, ad basim angustatis nigrescentibus glabris; annulo albo evidenti; pappo 1-seriato, squamulis ferme 8-10, 1.0-2.5 mm longis, rigidis, anguste lanceolatis peracutis.

TYPE: shrub to 3 m high, little-branched or virgate, ligules 20-25, yellow, frequent on rocky places and in thickets, scrub savanna, near south rim, Left

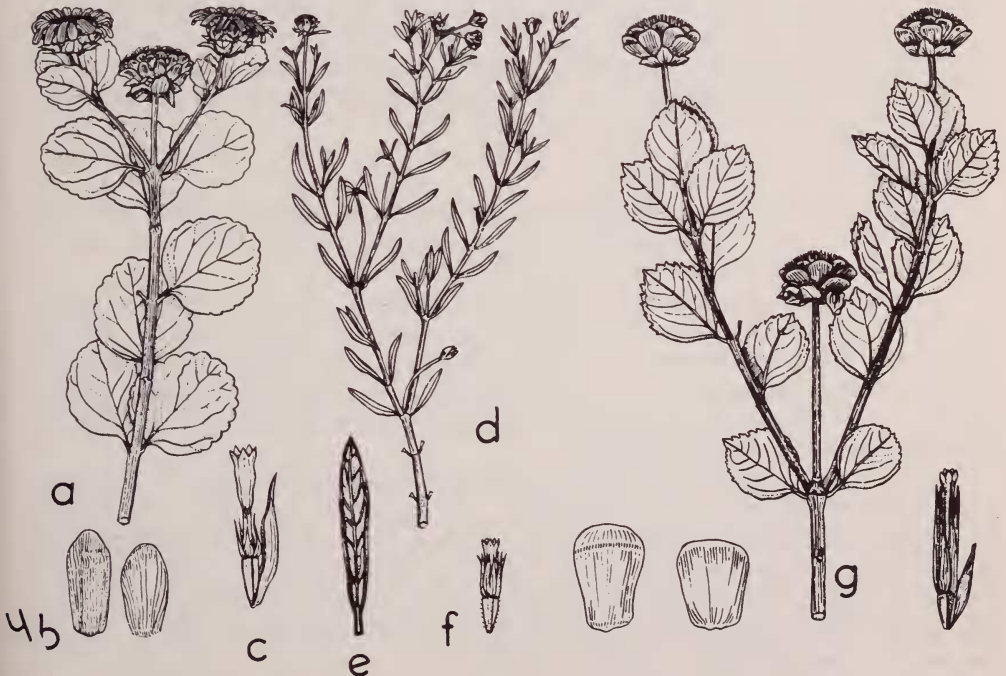


FIG. 70. a-c, *Calea punctata*. a, habit,  $\times \frac{1}{4}$ ; b, phyllaries,  $\times \frac{3}{4}$ ; c, floret with subtending palea,  $\times 1\frac{1}{2}$ . d-f, *Calea linearifolia*. d, habit,  $\times \frac{1}{4}$ ; e, leaf,  $\times \frac{1}{2}$ ; f, floret,  $\times 1\frac{1}{2}$ . g-i, *Calea lucida*. g, habit,  $\times \frac{1}{2}$ ; h, phyllaries,  $\times \frac{3}{4}$ ; i, floret with subtending palea,  $\times 1\frac{1}{2}$ .



Fork Caño Yutaje, at 1350 m alt., Cerro Yutaje, Amazonas, Venezuela, February 1, 1953, *Bassett Maguire & Celia K. Maguire* 35196 (NY). Paratypes: Cerro Yutaje, Venezuela, *Bassett Maguire & Celia K. Maguire* 35213, 35067, 35268.

*C. punctata* seems to have no immediate relatives, so far known, in the region of the Guayana sediments.

*Senecio yapacanus* Aristeguieta, sp. nov.

Suffrutex scandens ramis tenuissime arachnoideis. Folia alterna petiolata, chartacea. Petiolus 10-14 mm longus. Lamina elliptico-lanceolata apice acuta vel attenuata acuminata basi rotundata, margine integra vel minutissime denticulata, 8-12 cm longa, 3-5 cm lata, supra glabra, subtus tenuissimo velo lanato-arachnoideo praedita vel glabra. Inflorescentia terminalis paniculata, axi ramulisque leviter arachnoideis. Capitula discoidea, sessilia vel subsessilia glomerata disposita. Involucrum cylindraceum, 5.5-6 mm longum, bracteis 8 lineari-oblongis apice acutis glabris. Calyculus cum 5 bracteolis 2-3 mm longis, apice acuminatis, subglabris. Flores 10, 3 exterioribus femineis, corolla 4 mm longa, tubulosa glabra limbo 4-5-lobato; floribus centralibus hermaphroditis, corolla 5.5 mm longa, tubulosa glabra limbo 5-lobato. Achaenia glabra, 1.5 mm longa. Pappus albidus, 5 mm longus.

TYPE: Vine, flowers white, occasional in cumbre, elev. 1200 m, Cerro Yapacana, Terr. Amazonas, Venezuela, Jan. 3, 1951, *Bassett Maguire, Richard S. Cowan & John J. Wurdack* 30719 (NY). Paratype: Woody vine, occasional on west escarpment face, elev. 1800 m Cerro Huachamacari, Terr. Amazonas, Venezuela, Dec. 14, 1950, *Maguire, Cowan & Wurdack* 30232.

This new species is related to *S. oronocensis* DC. from the Bolivian Andes; it differs by its scarcely arachnoid-lanose leaves never completely covered by white tomentum on the lower surfaces and its completely glabrous involucreal bracts. The bracts of *S. oronocensis* are covered by a brown lanose tomentum. *S. oronocensis* was described from a Haenke collection, since credited to Venezuela. Dr. Cuatrecasas, however, informed me that the original locality was Bolivia or eastern Peru and that *S. baccaradiflorus* Rusby is a synonym of *S. oronocensis*.

*Senecio phelpsi* Cuatr., sp. nov.

Frutex scandens, ramis in sicco badiis subrugosis et parce granulosis peridermato plus minusve separabili extremis leviter striatis, valde juvenilibus lana crispa ferruginea satis decidua tectis mox glabris.

Folia alterna crassa viridia nitida, valde juvenilia tomento crispo ferrugineo deciduissimo munita mox glaberrima. Petiolus 2-8 mm longus crassus. Lamina succulenta oblongo-elliptica vel oblonga basi paulo attenuata apice obtusa vel acutiuscula margine integerrima, 5-10 cm longa, 1-2.8 cm lata, utrinque laevis; in sicco translucida, costa et nervis 5 paribus ascendentibus arcuatis filiformibus immersis transpecte visibilibus.

Inflorescentiae terminales corymboso-paniculatae pedunculatae exfoliatae. Pedunculus robustus folia excedentia cum ramis in statu juvenili tomento lanuginoso ferrugineo munitus mox glaber. Rami ramusculique subteneres striolati elongatique bracteolis lanceolatis vel linearibus muniti. Pedicelli graciles, sed praecipue erecti, striolati mox glabri 1-2 bracteolis brevibus muniti 1.4-5 cm longi, apice incrassati 1-2-bracteolati. Capitula radiata. Calyculus nullus. Involucrum campanulatum primum lanuginosum mox glabrum, 8 bracteis crassiuscule herbaceis oblongo-lanceolatis ca. 9 mm longis 1.8-3 mm latis, margine scariosis. Receptaculum alveolatum marginibus breviter fimbriatum 2 mm latum. Flores marginales feminei ligulatae 3-4, corolla lutea glabra ca. 14 mm longa,

tubulo crassiusculo 6 mm, ligula ovato-oblonga, 3 mm lata, 7-nervata, apice 3-dentata. Flores disci hermaphroditi 11-12, corolla tubulosa glabra lutea, 9 mm longa, tubulo 5 mm longo, dentibus linearibus, 1 mm longis. Antherae 3 mm longae, basi obtusae. Rami stigmatici elongati flexuosi apice subtruncati parce papilloso. Pappus stramineo-albicans.

TYPE: VENEZUELA: Terr. Amazonas: Cerro Guanay, Caño Guaviarito, Río Manapiare, Río Ventuari, infrequent, rocky elevations at 2,000 m alt. Subsucculent vine or scandent subshrub, *Bassett Maguire, Kathleen D. Phelps, Ch. B. Hitchcock & G. Budowski 31737* (NY; isotype, F).

*Senecio phelpisiae* is a striking species for its thick, smooth, fleshy, narrowly elliptical or oblong leaves. It is closely related to *S. jahnii* Cuatr. but differs from it by the very short-petiolate and narrower leaves which have another kind of nervation, by its smaller heads and flowers, and by the almost complete absence of a calycle. *S. cobrensis* Cuatr., a related species, has broader, acute, long-petiolate leaves and a different form and size of flowers. *S. cucullatus* Klatt has broader, long-petiolate leaves and smaller heads and flowers. *S. haughtii* Cuatr. has richer and denser inflorescences, shorter and more bracteolate pedicels and broader, long-petiolate leaves. The very deciduous woolly indument on the buds and young leaves and branchlets of *S. phelpsii* has not been observed in the other, related species.

#### Mutisieae.

Forty-nine species of Mutisieae are presently known from Guayana. They form a closely interrelated group of genera which suggest a history of closed phyletic development and phytogeographically restricted distribution. Of them, only one, *Gongylolepis columbiana* Cuatr., is extra-Guayanian (occurring in the eastern Andes of Venezuela and Colombia).

Previously to 1931, four members of this assemblage has been recognized, viz., *Gongylolepis benthamiana* Rob. Schomb., *Stiffitia martiana* Baker [*Gongylolepis martiana* (Bak.) Cuatr. & Steyerem.], *Stiffitia condensata* Baker [*Stomatochaeta condensata* (Bak.) Mag. & Wurd.], and *Quelchia conferta* N. E. Brown. During the period 1931-39, based on specimens collected by Tate, Blake proposed ten additional names (six in *Stenopadus*, including *S. cinereus* Gleason & Blake, herein transposed to *Chimantaea*, and *S. variabilis*, herein synonymized under *Stomatochaeta condensata*), bringing the total to 13. Now, in the past two decades, contemporary exploration in Guayana has brought to light 36 additional species (and 3 subspecific taxa), of which 14 have been published. Nine are described herein, and 13 are to be treated in the succeeding paper.

During the progress of botanical exploration in Guayana, there has accumulated an impressive and significant body of evidence bearing upon fundamental problems of plant phylogeny, relationships, and geography. Members of the Composite *Mutisieae* are of special interest in this regard. The following short consideration briefly summarizes arguments which support our interpretation of phyletic derivation and relationship, and hierarchal arrangement of Guayana mutisias. Dr. Sherwin Carlquist has examined our materials anatomically, and has provided a body of data which complements our own. His studies are presented in papers under the titles "Anatomy of Guayana Mutisieae. I. Pollen," and "Anatomy of Guayana Mutisieae. II. Floral Venation" (Mem. N. Y. Bot. Gard. 9:000-000. 1957). Pollen descriptions used in this paper are furnished by Dr. Carlquist.

#### Subtribe Gochnatinae.

Among the gochnatinioid representatives, i.e. those with regular corollas,

there are 32 remarkably clear-cut, distinct Guayanan species. They, by virtue of general facies and morphological characterization, fall into several readily recognizable natural generic groupings. Of these, the largest and basic assemblage (*Stenopadus* with fifteen clear-cut species) displays most strongly those characters which are generally accepted as primitive in the Compositae, viz., massive, many-flowered terminal, usually solitary, homogamous, rayless heads subtended by numerous multi-serial, relatively large phyllaries; strongly paleaceous receptacles; camose, regular corollas with complex morphology and vascular supply; complex achenial and stylar vasculature; simple stigmatic branches; subpaleaceous pappus; ample veiny leaves; and arboreous habit, in which the trunk may reach a diameter of several decimeters, and in which the wood is compact, very hard and heavy, with a specific gravity as much as 1.1 or 1.2.

The remaining gochnatioid genera (*Chimantaea*, *Stomatochaeta*, and *Quelchia*) (the extra-Guayanan *Stiffia* excepted), considered to have been derived from *Stenopadus* or stenopadan stock, display in common besides specialized differentiation along their own generic lines, thin-textured corollas with simplified morphology and vascularization. These more simple corollas are considered to be derived or "advanced." Characterization believed to be of phyletic significance is given for the several genera in question.

#### **Stenopadus.**

Significant trends or lines of modification have taken place within *Stenopadus* which have led to sectional differentiation. The four sections show complete or partial geographic containment. The section *Kunhardtia*, of four species, is considered basic or the most primitive because of its large, mostly many-flowered, numerous bracted heads, strongly paleaceous receptacles, and corollas with stamens attached within the corolla at the union of the distinct tube and limb. The single species of the section *Campestris* has similar but urceolate corolla with merely flexuous lobes. In the four species of the section *Connellia*, the attachment of anther filaments has moved up to the sinus, the receptacular pales have been reduced to a few in number or are lacking, and the pappus setae are filiform. In the six species of the section *Stenopadus*, the filaments are attached in the sinus, the receptacles remain strongly paleaceous, and leaves are strongly reticulate-veined. This last distinguishing feature makes members of the section *Stenopadus* immediately and easily recognized.

#### **Stiffia**

Morphologically most closely associated with *Stenopadus*, but geographically and probably historically most distantly set off from it. Further remarks are to be addressed to these problems.

#### **Stomatochaeta**

Consists of a compact closely interrelated group of four species distinctly set off from *Stenopadus* by fruticose habit, thickly coriaceous leaves with reduced nervature, small few flowered heads, with one or few receptacular pales, "advanced" corollas with simple vasculature, stiffly erect lobes much exceeding in length the undifferentiated 10-nerved tube, and very short, blunt style-branches.

**Chimantaea.** (to be described in a succeeding paper; Mem. N. Y. Bot. Gard. 9:000).

This is perhaps the most remarkable presumptive derivative of *Stenopadus*. As in *Stomatochaeta*, the leaves are thickly coriaceous, the receptacle epalea-



ceous except for a few marginal members which may represent merely inner reduced phyllaries, and the corolla more "advanced" with short, thin 5-nerved tube and stiff, erect lobes. In *Chimantaea* the corolla lobes are densely barbate, the achenes more often pubescent, and the nectar-gland at the summit of the achene external to the style base is prominent and deeply 5-lobed (in other members of the Guayana gochnatinias cylindric or prismatic). In habit, members of the genus are conspicuously specialized, having become subsucculent, depressed and little branched, or completely unbranched and in aspect more like a bromeliad or espeletia than any of its congeners. Indeed, *Chimantaea* seems in this respect well on the way to the development of the herbaceous habit. The genus, except for *C. cinerea* (on nearby Auyán-tepuí) is restricted to the Chimantá Massif.

#### Quelchia.

Shrubby with lateral compound inflorescence; has achieved the ultimate in capitulum reduction. All heads are uniflorous. The genus is geographically restricted to the eastern part of the Guayana Highland.

#### Subtribe Mutisinae.

Guayana members of the Mutisinae with bilabiate (or ligulate) corollas follow much the same pattern or organization and phyletic differentiation as that observed for the Gochnatinae. There is one central large "primitive" more or less polymorphic group, *Gongylolepis*, out of which, similarly, has come a series of small but distinct satellite genera.

#### Gongylolepis.

The basic genus, composed of eleven species and three subspecific taxa. It, like its gochnatinioid analogue, is arboreous, has large massive many-flowered, many-bracted terminal solitary heads, large flowers with complex venation, ample pinninerved leaves, and is geographically widespread throughout Guayana. It is believed to have given rise to at least three genera, each of which has 3 or fewer species. All are shrubby, have small few-flowered heads, simpler "advanced" small flowers, and are each geographically restricted.

#### Duidaea.

Has developed three distinct species, and is perhaps closest to *Gongylolepis* in general character. Its leaves are 1-nerved and linear, flowers have a simplified or "advanced" vascularization; and the pollen shows a prominent departure in form and ornamentation.

The two genera, *Neblinaea* and *Achnopogon* are monotypic, and each is geographically restricted to a single sedimentary massif. Both have compound, laterally disposed inflorescences and small heads with five or fewer flowers, the corollas of simple vasculature. Beyond these common features they differ greatly.

#### Neblinaea

A well-branched shrub with small gongylolepioid leaves, glabrous phyllaries and corollas, and anthers sagittate with adjacent tails connate.

#### Achnopogon

A suffrutescent shrub with a short thick primary axis bearing short-shoots terminated by dense rosettes of leaves, and provided with one or several virgate branches. Its phyllaries are strongly bearded, corollas puberulent, and anthers simply caudate but not sagittate, a feature peculiar to this among all the Guayana genera.

Monotypic *Glossarion* presents a particular problem, seeming to bridge or transcendent the limits of the subtribes Gochnatinae and Mutisinae.<sup>18</sup> In facies the shrub recalls the stenopadoid assemblage. The ligulate corolla has five equal lobes; hence, if reconstructed as a wholly gamopetalous corolla, it would certainly be actinomorphic and not bilabiate. Styles are smooth as in members of the *Mutisinae*, and the leaf base is half-clasping as in *Gongylolepis*.

Key to the Subtribes and Genera of Guayana Mutisieae

1. Corollas actinomorphic or essentially so; anthers caudately sagittate; subtribe Gochnatinae.
2. Corollas carnosae, glabrous, the gamopetalous portion much exceeding the tightly coiled lobes.
  3. Corolla-tube 15 (10)-nerved, much exceeding the tightly coiled 3 (2)-nerved lobes; tails of adjacent anthers connate (but easily separable); styles asperulous towards the tip, the branches 1.0-1.5 mm long, undifferentiated; heads massive, terminal, solitary, many-flowered (usually 40-100-flowered); achenes glabrous; corona cylindric, 0.5-1.0 mm high; trees.
    1. *Stenopadus*.
  3. Corolla-tube 5-nerved, lobes 2-nerved, styles completely smooth, the branches compressed, dilated with marginal stigmatic lines and acute appendages ca. 0.3 mm long; shrubs with slender glabrous branchlets, and narrowly elliptic acute or acuminate, thin-textured leaves; shrubs; confined to southern Brazil, and one species in the lower Rio Negro basin.
    - (*Stiffitia*.)
2. Corollas firm or submembranous, but not carnosae; the gamopetalous portion equaling or considerably shorter than the erect or merely recurved 2-nerved lobes.
  4. Heads solitary and terminal; corollas hirsute within the collar.
    5. Heads relatively large, 20-50-flowered; corolla-tubes 5-nerved, the lobes densely barbata-pilose at the tips (this pubescence largely deciduous at anthesis), erect or sometimes somewhat recurved; anther-tails all free; styles asperulous upwards, the branches undifferentiated, 0.7-1.0 mm long; achenes pubescent or glabrous, 6-9 mm long; corona 1.0-1.5 mm long, deeply 5-lobed; virgate or little-branched depressed, subsucculent shrubs.
      2. *Chimantaea*.
    5. Heads relatively small, 10-20 (30)-flowered; corolla-tube 10-nerved, the lobes glabrous, stiffly erect, 2-nerved; tails of adjacent anthers connate (but easily separable); styles asperulous upwards, the branches obtuse, ca. 0.5 mm long; achenes 6 mm or less long, glabrous, corona entire, 0.5 mm or less long; brittle, much-branched shrubs, the pubescence malpighioid.
      3. *Stomatochaeta*.
    4. Heads uniflorous, in axillary cymes; corollas glabrous within; tube 5-nerved, the lobes recurved, 2-nerved; style smooth, glabrous, the branches 1.2-1.75 mm long, 3-lobed; achenes glabrous, 4-6 mm long; corona cylindric, 0.3-0.5 mm long; upright, branched shrubs.
      4. *Quelchia*.
  1. Corollas ligulate, the ligule 5-oblong-dentate, 7-10-nerved; heads 12-16-flowered; anthers caudately sagittate; shrubs; subtribe Mutisinae.
    5. *Glossarion*.
1. Corollas bilabiate; subtribe Mutisinae.
  6. Heads 8-∞ flowered, massive, terminal, solitary or pedunculate, the peduncles sometimes branched.
    7. Leaves pinninerved; anthers caudately sagittate, the adjacent tails connate; achenes glabrous or essentially so; phyllaries broadly obtuse, more or less coriaceous.
      6. *Gongylolepis*.
    7. Leaves 1-nerved; anthers caudately sagittate, the tails free; achenes obviously pubescent; phyllaries acute or acuminate, more or less pergameneous or papyraceous.
      7. *Duidea*.
  6. Heads small, 2-5-flowered, the inflorescences axillary, in 3-7-headed cymes.

<sup>18</sup>We have attempted to accommodate our material to the organization of subtribes as presented by Hoffmann. It would seem, however, that fresh evaluation of the entire *Mutisieae* is now needed.

8. Phyllaries glabrous, the margins ciliolate; corolla funnel-formed, glabrous; caudal appendage of anther sagittate, the tails of adjacent anthers connate; style-branch tips ca. 1 mm long, rounded, undifferentiated; achene 6-7 mm long, 5-nerved; pappus 3-seriate; leaves oblanceolate. 8. *Neblinaea*.
8. Phyllaries strongly externally bearded; corolla goblet-shaped, puberulent; caudal appendage of anther linear, simple, not sagittate, not connate; style-branch tips obtuse, dorsally unilobate; achene 5-6 mm long, 10-nerved; pappus 5-seriate; leaves elliptic. 9. *Achnopogon*.

1. *Stenopadus* Blake, Bull. Torrey Club 58: 489. 1931, descr. emend.

In 1953\* we recognized six species in *Stenopadus* proper (*Eustenopadus* Blake), all endemic to the Guayana Highland. Now, as a result of further exploration, eight additional species have been collected (two of them to be described in the succeeding paper) in Venezuelan Guayana, and one, *S. colombianus* Cuatr. & Steyerl., has been described from Colombian Guayana.

Heads massive, terminal, solitary (in three species sometimes 2-4), homogamous, multiflowered [(15) 40-100]; receptacle glabrous, alveolate, strongly or sometimes not at all paleaceous; corolla actinomorphic, carose, essentially infundibuliform and differentiated into a cylindrical tube, an expanded limb, and tightly coiled, linear-lanceolate lobes, the tubular portion much exceeding the lobes, characteristically 3 (sometimes only 2) distinct veins extending from the base of the corollas into the lobes; anthers caudate-sagittate, the adjacent tails connate; filaments attached either in the sinus of the lobes, at the union of the tube and the limb, or below this union; pollen grains yellowish, tricolpate, the furrows long-pointed; grains prolate to subprolate (prolate-spheroidal in *S. campestris*), spinulose or psilate; polar axis 55-65  $\mu$ ; achenes prismatic, basically 10-nerved, glabrous; annulus mostly lacking; corona cylindrical; pappus-setae mostly subpaleaceous, flattened and connate into a ring at the base.

Trees.

TYPE species: *Stenopadus talaumifolius* Blake.

Key to the Sections and Species of *Stenopadus*

1. Leaves coriaceous, the lateral veins prominulous but the blades not reticulate-veined.
2. Filaments attached within the corolla at the union of tube and limb, hence at or below the middle of the gamopetalous portion and not at the sinus; receptacle strongly paleaceous; achene obviously 10-nerved; annulus lacking; setae subpaleaceous, 5-8-seriate, subconnate at the base.
3. Corolla infundibuliform, (18) 20-40 mm long, the lobes tightly coiled; filaments attached at the middle; sect. *Kunhardtia*.
4. Involucre broadly campanulate, 60-100-flowered; leaf-blades broadly obovate or obovate-oblanceolate, usually 8-25 cm long, 4-8 cm broad.
5. Involucre substipitate; heads 60-70-flowered; corollas ca. 40 mm long; anthers ca. 15 mm long; leaves usually 10-25 cm long, 6-8 cm broad. 1. *Stenopadus kunhardtii*.
5. Involucre sessile; heads 80-100-flowered; corollas ca. 30 mm long; anthers ca. 10 mm long; leaves usually 8-12 cm long, 3.5-6.0 cm broad. 2. *Stenopadus huachamacari*.
4. Involucre obconic or hypocateriform, 25-30-flowered; leaves obovate or oblanceolate, usually 6-12 cm long, 2-5 cm broad.
6. Phyllaries obtuse; involucre hypocateriform, strongly stipitate; heads 40-50-flowered; corollas 18-20 mm long; leaf-blades narrowly oblanceolate, 7-12 cm long, 3-5 cm broad; petioles 15-22 mm long. 3. *Stenopadus stipitatus*.

\*Maguire, B., Cowan, R. S. & Wurdack, J. J. The botany of the Guayana Highland. Mem. N. Y. Bot. Gard. 8: 153. 1953.



6. Phyllaries sharply acute, involucre obconic, 25-35-flowered; corollas 26-30 mm long; leaf-blades oblanceolate to obovate, 7-11 cm long, 3.5-5.0 cm broad; petioles 6-12 mm long. 4. *Stenopadus obconicus*.
3. Corolla campanulate, 16-18 mm long, the lobes flexuous, not coiled; filaments attached below the middle; involucre broadly campanulate, 25-35-flowered; leaves broadly oblanceolate or subcuneate; sect. *Campestris*. 5. *Stenopadus campestris*.
2. Filaments attached to the sinus; corolla-tube infundibuliform-ventricose; achenes with 5 principal nerves; annulus evident; setae 3-4-seriate, capillary, flattened at the base but not connate; sect. *Connellia*.
7. Leaves wholly glabrous or glabrescent; achenes 9-10 mm long.
8. Involucres 5-6 cm long; phyllaries ca. 15-ranked, the middle carinate, shining and strongly keeled, only the lowermost pubescent; corolla-tube 12-20 mm long, glabrous at the sinus within. 6. *Stenopadus connellii*.
8. Involucres 3.5-4.0 cm long; phyllaries 6-8-ranked, not strongly carinate, all externally strigillose; corolla-tube ca. 25 mm long. 7. *Stenopadus chimantensis*.
7. Leaves permanently sericeous beneath; achenes (3) 4-6 mm long.
9. Leaves 6-12 cm long, 4-8 cm broad, oblong-obovate, retuse and rounded at the apex; corolla-tube 8-9 mm long, very scantily pilose within at the sinus; achenes 3-4 mm long. 8. *Stenopadus sericeus*.
9. Leaves rhomboid-oblanceolate, 10-15 cm long, 5-6 cm broad, obtusish or acutish at the apex, narrowly acute to acuminate at the base; corolla tube 12-13 mm long, obviously pilose within at the sinus; achene ca. 5 mm long. 9. *Stenopadus ventricosus*.
1. Leaves (4) 6-18 (30) cm long, chartaceous or coriaceous, the lateral veins prominent, and the blade strongly reticulately-veined; phyllaries externally strongly pubescent; sect. *Stenopadus (Talaumifolius)*.
10. Branchlets strongly sericeous.
11. Phyllaries acute, not cucullate.
12. Heads 1-3, sessile or on very short peduncles, ca. 15-flowered; outer phyllaries ca. 2.5 mm wide, the inner ca. 1.5 mm wide; leaves obovate, 4-10 cm long; achene ca. 9 mm long, 4 (5)-angled, 12-nerved; corona ca. 1 mm high, prismatic, glabrous. 10. *Stenopadus talaumifolius*.
12. Heads apparently solitary, ca. 30-flowered; outer phyllaries 3.5-9.0 mm wide, the inner 2-3 mm wide; achene ca. 12 mm long, prismatic, 10 (12?)-nerved; corona ca. 0.7 mm high, prismatic, the sides strigose. 11. *Stenopadus eurylepis*.
11. Phyllaries obtuse, strongly cucullate; leaves 12-24 cm long, 6-11 cm broad. 12. *Stenopadus cucullatus*.
10. Branchlets glabrous or essentially so, or at least glabrate.
13. Leaf-blades 10-17 cm long.
14. Leaf-blades oblanceolate, attenuate at the base, dull on the upper surface; peduncles sparsely strigose (5) 10-30 cm long, heads 2-4, 20-30-flowered. 13. *Stenopadus cardonae*.
14. Leaf-blades elliptic-ovate to obovate, the apex acute or obtusish, merely acute at the base, lucidous on the upper surface; peduncle 3-5 cm long; heads solitary, 19-21-flowered. 14. *Stenopadus affinis*.
13. Leaf-blades 20-30 cm long, chartaceous; branchlets densely rufous; heads solitary sessile; phyllaries glabrous or essentially so, indurate, ciliolate, the lower member broadly ovate, obtuse; achene 3-5-angled, with 5 principal nerves; corona prismatic, ca. 0.8 mm long, sparsely hispid-subpilose at the periphery. 15. *Stenopadus colombianus*.

Section 1, *Kunhardtia* Maguire & Wurdack, sect. nov.

Capitula solitaria terminalia majuscula multiflora [(25) 50-100]; corollis in tubo, limbo, lobisque differentiatis; filamentis connectis tubo et limbo affixis; receptaculo valde paleaceo; achaeniis prismaticis; annulo deficienti; corona aliquantum 5-lobata; pappo 5-8-seriato, setis anguste subpaleaceis, ad basim connatis; foliis non reticulatis.

TYPUS: *Stenopadus kunhardtii* Maguire.

1. *Stenopadus kunhardtii* Maguire, Mem. N. Y. Bot. Gard. 8: 151. 1953.

TYPE: spreading tree 12 m high, 1500 m alt., Cerro Sipapo, Amazonas, Venezuela, *Maguire & Politi* 28303 (NY; the collection number was mis-cited in the original publication as 28304).

Distribution. Known only from Cerro Sipapo.

2. *Stenopadus huachamacari* Maguire, Mem. N. Y. Bot. Gard. 8: 151. 1953.

Type: Slender tree 10 m high, 1500 m alt., Cerro Huachamacari, Amazonas, Venezuela, *Maguire, Cowan & Wurdack* 30026 (NY).

Distribution. Known only from Cerro Huachamacari.

3. *Stenopadus stipitatus* Maguire & Wurdack, sp. nov.

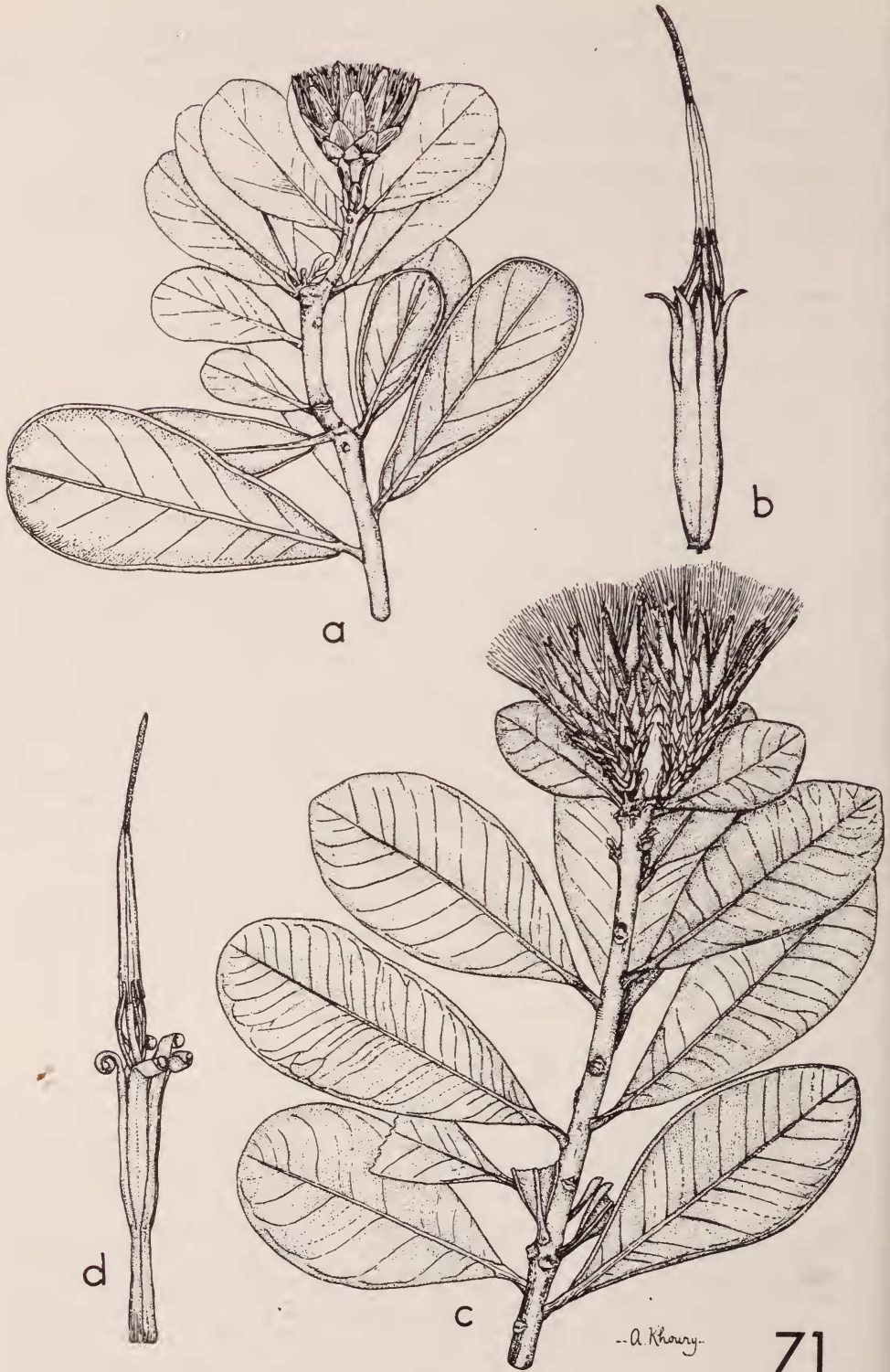
Arbor 4-6 m alta; ramulis teretibus in axillis foliorum dense pilosis, aliter glabris; foliis alternis, laminis elliptico-oblongatis, 7-12 cm longis, 3-5 cm latis, ad apicem rotundatis, basi acutis, venis primariis lateralibus prominulis, ca. 15-jugis in nervo marginali colectivo; petiolo lato, 3-5 mm longo; capitulo solitario sessili terminali majusculo, 40-50-floro homogamo; involucro hypoc crateriformi 6-7 cm alto, multiseriato; stipite 3.5-4.5 cm longo, 10-12-seriato, bracteis glabris deltoideo-ovatis vel ovatis 3-8 mm longis, carinatis, obtusis; phyllariis ca. 8-seriatis, vix carinatis, gradatis, inferioribus ovato-oblongis 1.5-2.5 cm longis, 7-8 mm latis, superioribus oblongo-lanceolatis ca. 3 cm longis, ca. 6 mm latis, obtusis, intimis anguste 2-3 mm latis; receptaculo plano alveolato sparse piloso multipaleaceo, paleis 2-3 mm latis; corollis glabris actinomorphis subventricosohypoc crateriformibus, tubo cylindrico 10-12 mm longo, limbo ca. 8 mm longo, lobis 7-8 mm longis, circinnatis acutis, 3-nervatis, nervis liberis ad basim corollae; filamentis ca. 17 mm longis, ad basim limbi affixis; antheris 12-13 mm longis, appendicibus apicalibus acutis, appendicibus caudalibus antherarum adjacentium connatis; stylis ca. 40 mm longis, sursum asperulis, ramulis ca. 0.5 mm longis compressis, aliquantum dilatatis, obovatis, acutiusculis; acheniis glabris, prismaticis, 4-angulatis, ca. 6 mm longis, annulo deficienti; corona ca. 0.5 mm longa, aliquantum 5-lobata; pappo ca. 22 mm longo, stramineo, (4) 5-seriato; setis anguste subpaleaceis, ad apices acute dilatatis, barbellatis, ad bases compressis minute connatis.

TYPE: small branched tree 4-6 m high, heads long-stipitate; infrequent, woodland along margins of Caño Yutaje, Right Fork, at 1500 m alt., Cerro Yutaje, Manapiare River, Terr. Amazonas, Venezuela, Feb. 21, 1953, *B. Maguire & C. K. Maguire* 35358 (NY).

Known only by the type collection.

4. *Stenopadus obconicus* Maguire & Wurdack, sp. nov. (Fig. 71.)

Arbor parva 1-5 m alta; ramulis teretibus, in axillis foliorum dense pilosis aliter glabris; foliis alternis, laminis 7-11 cm longis, 3.5-5.0 (6.0) cm latis, glabris, oblongo-oblongatis vel obovatis, ad apicem rotundis, ad basim acutis, costa subtus prominenti, aliquantum impressa supra; venis lateralibus primariis 8-10-jugis, in nervo marginali colectivo, prominulis subtus; petiolo 6-12 mm longo; capitulo solitario vel frequenter 2-3, sessili vel pedunculo 1-2 longo, majusculo, 25-35-floro, homogamo; involucro obconico 4.5-6.0 cm longo, 10-12-seriato, phyllariis numerosis glabris, anguste acute lanceolatis, gradatis minute scariociliatis, inferioribus 7-8 mm longis, superioribus ca. 4 cm longis, intimis non angustioribus; receptaculo plano alveolato moderate paleaceo, paleis 10-15, linearibus integris 0.6-0.8 mm latis acutis, ad apicem minute serrulatis, corollis actinomorphis glabris, parte tubulata 14-15 mm longa, non fere in tubo et limbo differentiatis, sursum expanso, lobis 12-14 mm circinnatis acutis 3-nerva-



--A. Khoury--



tis, nervis liberis ad basim corollae; filamentis ad basim limbi affixis; antheris 14-15 mm longis, appendicibus apicalibus acutis, appendicibus caudalibus linearibus antherarum adjacentium connatis; stylis ca. 42 mm longis, sursum asperulis, ramulis ca. 1 mm longis, patentibus, compressis aliquantum dilatatis, acutiusculis; achaeniis plus minusve prismaticis, rubritinctis, 6-7 mm longis, 10-nervatis, glabris; annulo deficienti, corona aliquantum 5-lobata, ca. 0.8 mm alta; pappo sordido, ca. 2 cm longo, (4) 5-seriato, setis anguste subpaleaceis ad apices acute dilatatis, barbellatis, ad bases compressis minute connatis.

TYPE: small tree 2-5 m high, often virgate, leaves coriaceous, involucre green, obconic, bracts brown-tipped, frequent in low *Bonnetia* bush, vic. Cumbre Camp at 1700 m alt., Cerro de la Neblina, Terr. Amazonas, Venezuela, January 4, 1954, Maguire, Wurdack & Bunting 37041 (NY). Paratypes, all from Cerro Neblina: shrub or tree 1.5-4.0 m high, border of open savanna at 1800 m, Maguire, Wurdack & Bunting 37150; small tree or shrub 1-2 m high, flowers yellow-brown, frequent, along West Escarpment at 1850 m alt., Maguire, Wurdack & Bunting 37005; shrub or small tree, heads obconic, frequent, cumbre savanna, at 1800 m alt., Maguire, Wurdack & Bunting 37077.

#### Section 2. *Campestris* Maguire & Wurdack, sect. nov.

Capitula solitaria terminalia; corollis urceolatis in tubo et limbo nondifferentiatis, lobis flexuosis, 3-venatis; filamentis submedio affixis; receptaculo paleaceo; achaeniis subprismaticis; corona aliquantum 5-lobata; pappo 4-5-seriato, setis anguste subpaleaceis, ad basim connatis; foliis non reticulatis.

TYPUS: *Stenopadus campestris* Maguire & Wurdack.

#### 5. *Stenopadus campestris* Maguire & Wurdack, sp. nov. (Fig. 71.)

Arbor parva vel 5 m alta; ramulis glabris, axillis foliorum exceptis; foliis alternis subconfertis; laminis glabris, coriaceis, oblanceolatis vel obovatis subcuneatis, (5) 8-13 cm longis, 2.5-6.0 cm latis, marginibus revolutis, costa subtus prominenti, venis lateralibus 5-6-jugis, improminulis; petiolo 4-8 mm longo; capitulo solitario terminali, paucipedunculato, 20-30-floro, homogamo; involucre hemisphaerico, 2.2-2.8 cm alto 5-6-seriato; phyllariis glabris obtusis, subcarinosis conspicue scario-marginatis, inferioribus late ovatis vel oblongis, 5-15 mm longis, superioribus oblongis vel oblongo-lanceolatis, 4-6 mm latis, 15-25 mm longis, intimis angustioribus ca. 1.5 mm latis; corollis glabris, tubo urceolato ca. 10 mm longo, lobis linearibus 7-9 mm longis, obtusis, flexuosis, non circinnatis valde 3-venosis, venis liberis ad basim tubi; filamentis ca. 25 mm longis, subter tubi medio affixis; antheris 10-11 mm longis; appendicibus apicalibus 2.5-3.0 mm longis, acutiusculis, appendicibus caudalibus sagittatis, ca. 1.5 mm longis, linearibus truncato-acutis, adjacentibus omnino connatis; stylis subulatis, 32-35 mm longis, sursum valde asperulis, ramulis 1.5-1.8 mm longis, non differentiatis obtusiusculis; achaeniis immaturis glabris prismaticis valde 10-costatis, ca. 6-8 mm longis; annulo deficienti; corona 0.5-0.6 mm longis, 5-lobatis sparse hirsuto-pilosis; pappo fulvo, setis 4-5-seriatis, subpaleaceis, 10-18 mm longis, ad basim 0.2-0.5 mm latis, breviter connatis, minute barbellatis.

TYPE: shrubby tree 1.5-5.0 m high, flowers straw-colored, frequent, thickets about edge, Sabana Venado, Caño Pimichín, 2 km above Puerto Pimichín, at 140 m alt., Río Guainfa, Territorio Amazonas, Venezuela, April 14, 1953, Maguire &

#### Explanation of figure 71

FIG. 71. *a-b*, *Stenopadus campestris*. *a*, habit,  $\times \frac{1}{2}$ ; *b*, corolla,  $\times 2$ . *c-d*, *Stenopadus obconicus*. *c*, habit,  $\times \frac{1}{2}$ ; *d*, corolla,  $\times 2$ .

*Wurdack* 35578 (NY). Paratypes: data as above, *Maguire & Wurdack* 35573; same locality, November 23, 1953, *Maguire, Wurdack & Bunting* 36343.

Distribution. Known only from the type locality, Sabana Venado, where it is a frequent shrub about thicket and woodland margins.

### Section 3. *Connellia* Maguire & Wurdack, sect. nov.

Capitula solitaria, terminalia, majuscula 20-40-flora; receptaculo epaleaceo vel paucipaleaceo; filamentis in sinibus affixis; achaeniis prismaticis; annulo deficienti; pappo 3-5-seriato, setis filiformibus; foliis non reticulatis.

TYPUS: *Stenopadus connellii* (Baker) Blake.

### 6. *Stenopadus connellii* (Baker) Blake, Bull. Torrey Club 58: 490. 1931.

*Stiffia connellii* Baker. Trans. Linn. Soc. II. 6: 40. pl. 8. 1901.

TYPE: summit of Mount Roraima, 8600 feet, *McConnell & Quelch* 661 Kew.

Distribution. Presently known only from Mt. Roraima and Chimantá-tepuí, occurring in cumbre woodlands at 2000-2300 m alt.

Only a single collection from Mt. Roraima (*Tate* 439, NY) has been available for this study. The corolla-tubes of the specimen reach a length of nearly 20 mm, whereas the corollas of the much more amply represented Chimantá population develop tubes only 12-14 mm long. This may represent a racial difference.

### 7. *Stenopadus chimantensis* Maguire, Steyermark & Wurdack.

Described in "Botany of the Chimantá Massif."<sup>19</sup>

### 8. *Stenopadus sericeus* Maguire & Aristeguieta, sp. nov.

Arbor parva, 3-8 m alta; ramulis compacte strigoso-sericeis; foliis alternis, laminis firme chartaceis vel subcoriaceis, 6-12 cm longis, (3) 4-8 cm latis, oblongo-obovatis, rotundatis, ad apicem retusis apiculatisque, basi obtusis vel acutiusculis; costa prominenti, venis lateralibus primariis ca. 8-jugis, prominulis supra, subtus improminulis, aequaliter compacteque strigoso-sericeis cum pilis malpighioides; petiolo 14-18 mm longo; capitulo solitario terminali sessili, a paucis parvis foliis caducis subtentis, 20-25-floro homogamo; involucre 4.0-4.5 cm longo, anguste campanulato; phyllariis gradatis (7) 9-10-seriatis, glabris, subcarnosis sed non carinatis, lucidis, marginibus anguste erosi-scariosis, inferioribus late ovatis, obtusiusculis 5-20 mm longis, superioribus late lanceolatis 25-35 mm longis, apicibus acutiusculis aliquantum cucullatis, intimis angustioribus; receptaculo plano, glabro, alveolato, epaleaceo; corollis subcarnosis, limbo subventricoso, 8-9 mm longo, vena intermedia tenui; lobis circinnatis vel aliquantum flexuosis, linearibus, 16-17 mm longis, persparse in sinibus pilosis, apicibus aliquantum dorsiventraliter compressis; filamentis longiexsertis, in sinibus affixis, laxe adnatis tubo corollae; antheris 11-12 mm longis; appendicibus apicalibus ca. 0.3 mm longis, appendicibus caudalibus sagittatis ca. 2.5-3.0 mm longis acutis, adjacentibus omnino connatis; stylis subulatis ca. 4.0 cm longis, asperulis sursum, ramulis ca. 1 mm longis, compressis obtusis marginibus subscariosis; achaeniis 3-4 mm longis, prismaticis 5-angulatis; annulo perspicuo; corona cylindrica ca. 1 mm longa; pappo sordido, ca. 15 mm longo, 3-seriato, setis aliquantum ad bases compressis, inconspicue barbellatis.

TYPE: tree 3-6 m high, leaves densely sericeous beneath, occasional, dense scrub bush below west escarpment, at 2200 m alt., Ilu-tepuí, Gran Sabana, Edo. Bolívar, Venezuela, March 20, 1952, *Maguire* 33490 (NY). Paratype: tree

<sup>19</sup>Mem. N. Y. Bot. Gard. 9:393-439. 1957.

4-8 m high, leaves sericeous beneath, occasional, upper slopes below saddle between North Peak and central plateau, 2300 m alt., Ilu-tepuí, March 15, 1952, Maguire 33415.

9. *Stenopadus ventricosus* Maguire & Aristeguieta, sp. nov.

Arbor mediocris; ramulis dense strigoso-tomentosis, cum pilis fuscis malpighioideis; foliis alternis, laminis firme chartaceis rhomboideo-oblongeolatis, (6) 10-15 cm longis, 5-6 cm latis, dense et compacte strigoso-tomentosis subtus, costa prominenti, venis lateralibus primariis 5-6-jugis, subtus prominulis, supra improminulis, apice obtusiusculo vel acutiusculo, basi anguste acute vel acuminata; petiolo 15-25 mm longo; capitulo solitario, sessili, terminali, paucis bracteoides foliis subtento, 25-30-floro, homogamo; involucre angusta campanulato, 4.5-5.0 cm longo, in alabastro rhomboideo; phyllariis ca. 35, 6-7-seriatis, glabris, anguste scarioso-marginatis, lucidis carnosis sed non carinatis, inferioribus late deltoideis vel oblongo-ovatis obtusis, 5-20 mm longis, superioribus oblongo-lanceolatis 30-45 mm longis obtusis, intimis angustis subcucullatis; receptaculo glabro alveolato epaleaceo; corollis subcamosis, tubo ventricosourceolato 12-13 mm longo, 6-7 mm diam. (8 mm compresso), lobis valde circinnatis, ca. 18 mm longis, 1.5 mm latis, 3-venosis, apice acutiusculo aliquantum dorsiventraliter compresso; filamentis filiformibus, longiexsertis, in sinibus affixis, ad sinum dilatatis, tubi basi adnatis; antheris 14-15 mm longis, appendicibus apicalibus ca. 3.5 mm longis, acutissimis, appendicibus caudalibus sagittatis ca. 4 mm longis, linearibus, apicibus eroso-acuminatis, adjacentibus omnino connatis; stylis subulatis, ca. 4.5 cm longis, sursum asperulis, ramulis 1.2-1.5 mm longis, aliquantum compressis, obtusis; achaeniis ca. 5 mm longis, nigro-purpureis, glabris, 5-angulatis, 10-nervatis; annulo deficienti; corona ca. 1 mm longa, truncata; pappo sordido, ca. 20 mm longo, 3-4-seriato, setis filiformibus, inconspicue barbellatis.

TYPE: tree 10-12 m high, flowers cream-white, occasional, margin of woodland, east slope at 2200 m alt., Serra do Sol (Uei-tepuí), Brazilian, Venezuelan frontier, Terr. Río Branco, Brazil, Edo. Bolívar, Venezuela, December 28, 1954, Maguire & Maguire 40401 (NY).

Distribution. Known only from the type locality, occurring as small to medium trees about montane forest margins, on the summit of Serra do Sol. Most closely related to *S. sericeus* from Ilu-tepuí some 100 km to the northward.

Section 4. *Stenopadus*.

Heads solitary or sometimes 2-3, 15-40-flowered; corolla infundibuliform, the filaments attached in the sinuses; receptacle strongly paleaceous; achenes prismatic; corona prismatic, slightly 5-sulcate, often pubescent; pappus 5-8-seriate, the setae narrowly subpaleaceous, flattened and united at the base; leaf-blade strongly reticulate-veined.

TYPE: *Stenopadus talaumifolius* Blake.

10. *Stenopadus talaumifolius* Blake, Bull. Torrey Club 58: 491. 1931.

TYPE: Savanna Hill at 4400 ft alt., Cerro Duida, Amazonas, Venezuela, Tate 759 (NY).

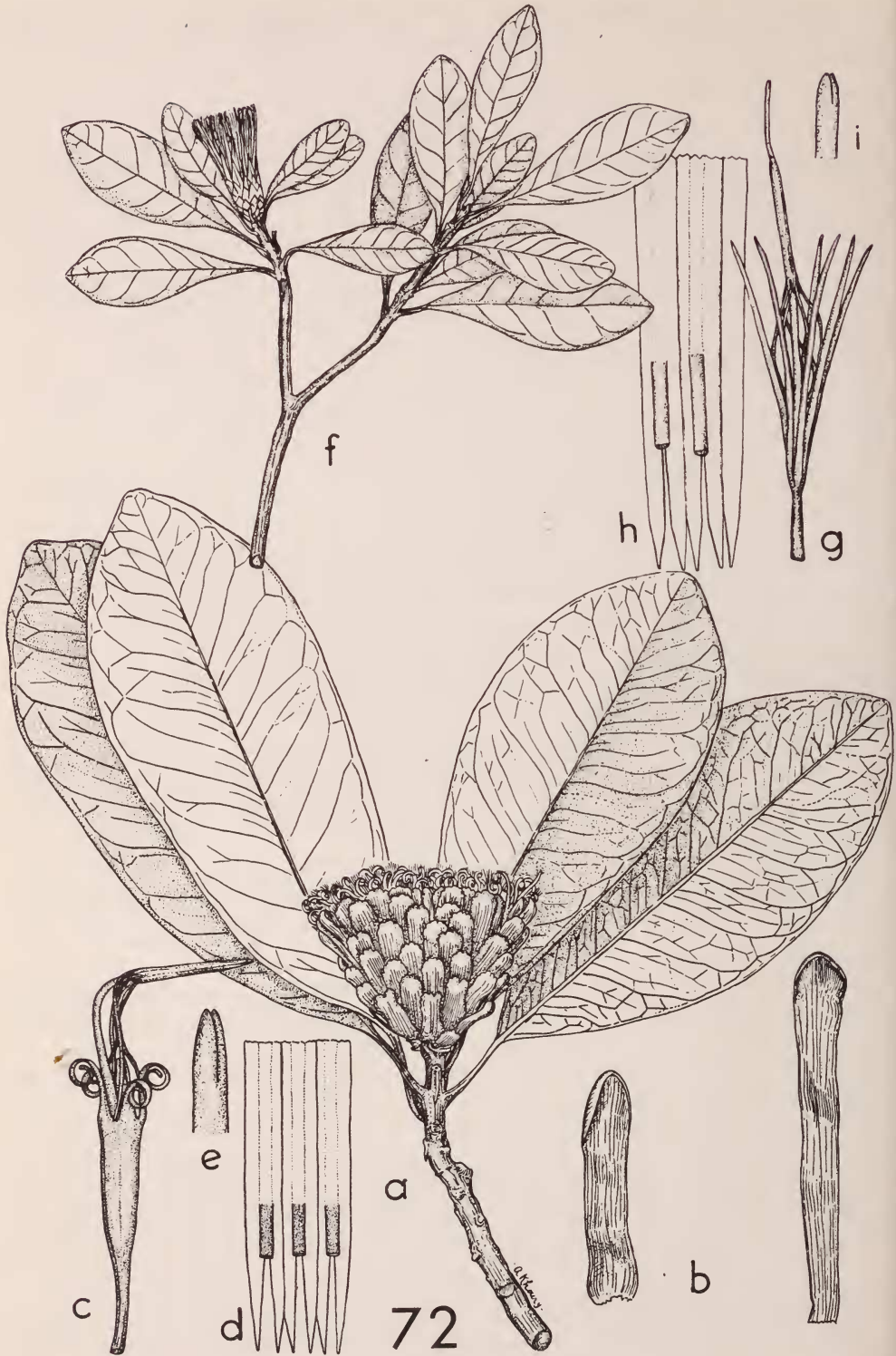
Known only by the type collection.

11. *Stenopadus eurylepis* Blake, Bull. Torrey Club 58: 492. 1931.

TYPE: Agüita, at 3100 ft alt., Cerro Duida, Amazonas, Venezuela, Tate 935 (NY).

Known only by the type collection.





12. *Stenopadus cucullatus* Maguire & Wurdack, sp. nov. (Fig. 72.)

Arbor mediocris vel 20 m alta, 30 cm diam.; ramulis teretibus, compacte fulvo-sericeis cum trichomis malpighioides; foliis alternatis, laminis glabris firme chartaceis, valde reticulatis; plus minusve ellipticis, 12-24 cm longis, 6-11 cm latis, apice obtuso vel late brevicauminato saepe conduplicato, basi acutiuscula saepe inaequilatera conduplicataque; petiolo 2-3 cm longo, tenuiter sericeo, (in sicco) sulcato; capitulo solitario, terminali, sessili, majusculo plus minusve 100-floro homogamo; involucre hemisphaerico vel late campanulato, 3.5-4.5 cm alto, 10-12-seriato; phyllariis plus minusve 100, gradatis, inferioribus 12-15 mm longis, lanceolatis obtusis externe puberulis; superioribus 15-38 mm longis, 8 mm latis, glabris deorsum, late obtuse cucullatis, marginibus scariosis; intimis lineari-oblongis vel oblanceolatis, ca. 3 mm latis, glabris deorsum, receptaculo plano, glabro, alveolato, numerose paleaceis, paleis phyllariis interioribus similibus sed 0.6-0.8 mm latis, ad apicem dilatatis; corollis subcarnosis, tubo 20-22 mm longo, subventricosso-hypocrateriformi, lobis 12-14 mm longis, valde circinnatis, acutis; filamentis ca. 10 mm longis, in sinibus affixis; antheris ca. 14 mm longis, appendicibus apicalibus 3-4 mm longis, acutis, appendicibus caudalibus sagittatis, 3 mm longis, linearibus, glabris, acutis, adjacentibus omnino connatis; stylis subulatis ca. 50 mm longis, sursum asperulis, ramulis ca. 1.2-1.4 mm longis, obtusis, non differentiatis; achaeniis prismaticis glabris fusco-rubris 10-nervatis, ca. 10 mm longis; annulo inconspicuo; corona 0.7-0.8 mm alta, aliquantum prismatica, persparse pilosa ad apicem; pappo stramineo ca. 25 mm longo, setis 4-5-seriatis, filiformibus aliquantum compressis ad basim, minute barbellatis sursum.

TYPE: tree to 20 m high, 25 cm diam., involucre bracts russet-brown; corollas and styles lavender; anthers yellow; occasional in mixed montane forest at 1000 m alt., Cerro Yutaje, Río Manapiare, Terr. Amazonas, Venezuela, February 4, 1953, B. Maguire & C. K. Maguire 35053 (NY). Paratypes: Cerro Yutaje: tree 5-8 m high, Maguire & Maguire 35029; tree 8 m high, 1400 m alt., Maguire & Maguire 35120. Cerro Coro-Coro, Serranía Yutaje: tree 3-6 m, Maguire & Maguire 35459; 1200 m alt., Maguire & Maguire 35491.

13. *Stenopadus cardonae* Maguire & Lasser, Mem. N. Y. Bot. Gard. 8: 150. 1953.

TYPE: Cerro Arepauchi, Río Caroní, Bolívar, Venezuela, Cardona 1181 (NY).

Distribution. Small trees of the Gran Sabana, Venezuela, and adjacent British Guiana.

14. *Stenopadus affinis* Maguire, Steyermark & Wurdack.

Described in "Botany of the Chimantá Massif."<sup>20</sup>

15. *Stenopadus colombianus* Cuatrecasas & Steyermark, Bot. Mus. Leafe. 17: 99. 1955.

TYPE: Cerro Isibukuri, Río Kananari, Vaupés, Colombia, Schultes & Cabrera 15031 (F).

Known only by the type collection.

<sup>20</sup>Mem. N. Y. Bot. Gard. 9:393-439. 1957.

Explanation of figure 72

FIG. 72. a-e, *Stenopadus cucullatus*. a, habit,  $\times \frac{1}{2}$ ; b, phyllaries,  $\times 1\frac{1}{2}$ ; c, corolla,  $\times 1\frac{1}{2}$ ; d, diagrammatic representation of portion of the base of the anthers showing the caudal appendages,  $\times 10$ ; e, style branches,  $\times 10$ . f-i, *Stomatochaeta cylindrica*. f, habit,  $\times \frac{1}{2}$ ; g, corolla,  $\times 2$ ; h, portion of anther base,  $\times 20$ ; i, style branches,  $\times 10$ .

*Stiffia* Mikán.

*Stiffia chrysantha* Mikán, Del. Bras. pl. 1. 1820.

*Stiffia parviflora* D. Don, Trans. Linn. Soc. 16: 294. 1830.

*Stiffia uniflora* Ducke, Rodriguesia 2: 157. 1936.

There is some doubt that *Stiffia uniflora* is generically compatible with the other two components of *Stiffia*, yet it is more closely allied with them than to other members of the Gochnatinae. These brief remarks will apply to the three species as though they are congeneric.

In general facies, *Stiffia* is easily distinguishable from *Stenopadus* (with which it has been sometimes associated). It is a glabrous shrub with slender branches, thin, elliptic, acute, slender-petioled leaves, and solitary large-heads or smaller heads paniculately arranged. The flowers are more or less similar in form to those of *Stenopadus*, but have more advanced vasculature, more highly specialized pollen grains,<sup>21</sup> and more highly differentiated style-branches (as noted in our "key").

Elsewhere it has been suggested that *Stiffia* (sensu lat.) constitutes a discrete phyletic line anciently cut off from *Stenopadus* (as have been other phyletic segregates, viz. *Chimantaea*, *Stomatochaeta*, and *Quelchia*), and now (except *Stiffia uniflora*) occupies the trans-Amazon region of central and southern Brazil.

*Stomatochaeta* (Blake) Maguire & Wurdack, stat. nov.

*Stenopadus* subgen. *Stomatochaeta* Blake, Bull. Torrey Club 58:490. 1931.

Heads solitary, terminal, few-flowered (10-20 [30]); involucre strongly graduate; receptacle plane or shallowly convex, epaleaceous except for 2-4 very narrow marginal pales, or in two species also with 1-4 additionally more centrally placed pales; corollas with internal hirsute collars, otherwise glabrous, the lobes stiffly erect, a lacking median vein, 2-4 times longer than the thin-textured 10-nerved tube; apical appendage of anthers sharply acute (ca. 3 mm long), caudal appendage sagittate, the tails linear, adjacent ones connate but easily separable; pollen grains yellowish, tricolpate, the furrows long-pointed; grains subprolate, sulcosilate, the polar axis 45-50 $\mu$ ; styles asperulous toward the tip, the branches ascending or erect, short, obtusish, 0.5 mm or less long; achenes 6 mm or less long, glabrous, quadrangular, 10-nerved; annulus lacking; corona entire low (ca. 0.5 mm long) bordered externally by a ring of pilose hairs; pappus 4-6-seriate, the setae flattened and free at the base, minutely upwardly barbellate. Shrubs; leaves coriaceous with veins (except *S. cylindrica*) immersed; trichomes malpighioid.

TYPE: species: *Stomatochaeta crassifolia* (Blake) Maguire & Wurdack.

#### Key to the Species to *Stomatochaeta*

1. Microphyllous shrubs, with leaves normally 1-3 cm long, 2.5-20 mm broad, 1-nerved or with lateral veins most obscure; involucre 6-7-seriate.
2. Leaves broadly to narrowly obovate (1.5) 2-3 (5) cm long, (0.7) 1.0-2.0 (3.0) cm broad; petioles 1-3 mm long; achenes 3 mm long; phyllaries glabrous.
  1. *Stomatochaeta condensata*
  2. *Stomatochaeta cymbifolia*.

<sup>21</sup>See Mem. N. Y. Bot. Gard. 9:441-452. 1957.



1. Macrophyllous shrubs with leaves normally 3-8 cm long, 2-5 cm broad; lateral veins quite evident; involucre 8-12-seriate.
3. Leaf-blades usually 3-7 cm long, 1.0-2.5 cm broad; involucre cylindrical-campanulate; phyllaries strigose-sericeous. 3. *Stomatochaeta cylindrica*.
3. Leaf-blades usually 5-8 cm long, 3-5 cm broad; involucre broadly campanulate; phyllaries glabrous. 4. *Stomatochaeta crassifolia*.

1. *Stomatochaeta condensata* (Baker) Maguire & Wurdack, comb. nov.

*Stiffia condensata* Baker in Mart. Fl. Bras. 6<sup>3</sup>: 351. 1884.

*Stenopadus condensatus* (Baker) Blake, Bull. Torrey Club 67: 299. 1940.

*Stenopadus variabilis* Blake, Brittonia 3: 202. 1939.

*Stenopadus guaiquinimensis* Badillo, Bol. Soc. Venez. Ci. Nat. 9: 136. 1944.

TYPE: "Habitat in Guiana Britannica: Rob. Schomb. N. 543!" (K). [Probably collected in Venezuela.]

Distribution. Widely distributed on open savannas, about thickets, and as a component of low brushland, Holi-tipu and the Ayanganna Savannas, British Guiana; the Gran Sabana and Cerro Guaiquinima, Venezuela, from 800 to 2000 m altitude on sandstone areas.

2. *Stomatochaeta cymbifolia* (Blake) Maguire & Wurdack, comb. nov.

*Stenopadus cymbifolius* Blake, Brittonia 3: 201. 1939.

TYPE: Auyán-tepuí, at 2200 m altitude, Edo. Bolívar, Venezuela, December 1937-January 1938, *Tate* 1322 (NY).

Distribution. Known only by the type from Auyán-tepuí and from the nearby Chimantá-tepuí, where the small shrub is generally distributed on the cumbre above 2000 m altitude. Obviously most closely related to *S. condensata*.

3. *Stomatochaeta cylindrica* Maguire & Wurdack, sp. nov. (Fig. 72.)

Frutex, 2-5 m alto, ramulis 2-3 m diam., dense compacteque fulvo-strigulosus, cum pilis malpighioideis; laminis glabris basibus costis exceptis, coriaceis, (2.5)-3-7(9) cm longis; 1.0-2.5 (3.2) cm latis, oblanceolatis, rotundatis obtusis vel acutiusculis apicibus, basibus acutis; improminule pinnivenosis supra, prominulis subtrus, venis 4-6-jugis, marginibus costato-involutis; petiolis 5-10 mm longis, strigulosus; capitulis cylindrico-campanulatis 8-15-floris homogamis; involucre 3.0-3.5 cm longo, 6-7 mm basi lato; phyllariis 35-40, 10-12-seriatis, gradatis, externe fulvo-strigoso-sericeis, inferioribus deltoideis ovatis 2-10 mm longis, interioribus lineari-lanceolatis attenuato-acuminatis, 12-30 mm longis; paleis receptaculi 1-2; phyllariis 2-3 marginalibus angustis; tubis corollae 6-7 mm longis glabris, piloso-hirsutis in collari intus; lobis linearibus 18-20 mm longis, ca. 0.4 mm latis, rigidis, erectis, 2-venosis, cum appendicibus triangularibus asperulis 5-6 mm longis; antheris 12-13 mm longis, appendicibus caudalibus linearibus ca. 3 mm longis connatis; achaeniis 6.0-6.5 mm longis, obscure 4-angulatis, glabris, annulis ca. 0.5 mm longis; pappo sordido ca. 20 mm longo, 5-6-seriato; setis delicate filiformibus, minute barbellatis supra.

TYPE: small flexuous tree 2-5 m high, flowers yellowish, fewer than 15, occasional about "bush islands" in *Stegolepis* savanna, 1 km east Cumbre Camp, at 1800 m altitude, Cerro Guaiquinima, Edo. Bolívar, Venezuela, Dec. 26, 1951, *Bassett Maguire* 32782 (NY).

Besides the type, known otherwise also only from the cumbre of Guaiquinima, where it is conspicuous about thickets of forest margins: *Maguire* 32728, 32855, 33003, 33062.

4. *Stomatochaeta crassifolia* (Blake) Maguire & Wurdack, comb. nov.

*Stenopadus crassifolius* Blake, Bull. Torrey Club 58: 493. 1932.

TYPE: Central Camp at 5000 feet altitude, Cerro Duida, Amazonas, Vene-

zuela, *Tate 1014* (holotype NY). In addition, known from Duida by *Tate 415* and *Steyermark 58354*; from Cerro Huachamacari by *Maguire, Cowan & Wurdack 30049, 30069, 30115, 30243, 30291*; and from Cerro Parí by *Cowan & Wurdack 31102, 31162*.

Frequent and generally distributed on breaks, escarpments and margins of thickets at 1500 m altitude or higher; the higher sandstone mountains of Terr. Amazonas, south of the Río Ventuari.

**Glossarion** Maguire & Wurdack, gen. nov.

Capitula mediocria, homogama 12-16-flora; involucrio cylindrico-conico; receptaculo aliquantum convexo, alveolato, hirsuto, epaleaceo; phyllariis numerosis gradatis coriaceis; corollis ligulatis, ligula 5-dentato-lobata; filamentis in collo affixis; antheris sagittatis caudatis; appendicibus adjacentibus linearibus connatis; granis pollinis rubris, tricolpatis, sulcis longiacutis; granis sphaeroides, spinulosis, axibus polaribus ca. 55 $\mu$ ; stylis laevibus, ramulis perlongis (3 mm) truncatis, dorso minute 3-lobatis; achaeniis probabiliter prismaticis, 10-costatis, annulo deficienti; corona 5-brevilobata; pappo uniformi, setis capillaribus. Frutex; foliis alternis; basibus petiolorum semivaginatibus; unitypicis.

TYPUS: *Glossarion rhodanthum* Maguire & Wurdack.

*Glossarion* is a diminutive of *glossa* ( $\gamma\lambda\omega\sigma\sigma\alpha$ ), tongue.

**Glossarion rhodanthum** Maguire & Wurdack, sp. nov.

Frutex 2-10 dm altus, saepe depressus; ramulis dense fulvo-piloso-tomentosis, saepe argenteis, internodiis 4-6 mm longis; foliis alternis petiolatis; laminis subcoriaceis ellipticis vel elliptico-oblanceolatis, (4) 6-11 cm longis, (1.0) 1.5-4.0 cm latis, supra glabris, subtus dense fulvo-tomentosis; margine revoluta; costa prominenti, supra immersa, nervis lateralibus prominulis 18-20-jugis, venis ultimis reticulatis; apice acutiusculo, basi acuta vel acuminata; petiolo 1.5-2.5 cm longo, ad basim in semivaginam 1.0-1.5 cm lata expansa; capitulo solitario terminali vel pseudoterminali vel manifeste laterali 12-16-floro, homogamo, brevipedunculato, bracteato, 1-2 cm longo; bracteis lancoelatis acutissimis dense piloso-tomentosis, inferioribus late lanceolatis, 5-7 mm latis, 10-20 mm longis, superioribus lineari-lanceolatis, 2-4 mm latis, 25-30 mm longis; involucrio cylindrico-conico 3.8-4.2 cm longo, 8-10-seriato, phyllariis valde gradatis lanceolatis acutissimis, tenuiter lanoso-canescens, demum glabrescentibus, marginibus valde piloso-ciliatis; receptaculo aliquantum convexo, alveolato, hirsuto, epaleaceo; corollis ligulatis rubris, ligula ca. 20 mm longa, 4-5 mm lata, ad apicem circinnata, lobis 5, oblongo-deltaideis, ca. 0.8 mm longis, obtusiusculis, pilosis; tubo ca. 1 cm longo; filamentis 12-14 mm longis, in collari insertis, 1 mm subter sinu; antheris ca. 20 mm longis, appendicibus apicalibus ca. 2.5 mm longis, acutis; appendicibus caudalibus sagittatis, 6-7 mm longis, linearibus, adjacentibus omnino connatis; stylis glabris laevibus 28-30 mm longis; ramulis patentibus ca. 3 mm longis, truncatis, dorso minute 3-lobatis; achaeniis 7-8 mm longis, glabris, 10-costatis; annulo deficienti; corona ca. 0.4 mm longa, aliquantum 5-lobata; pappo sordido, ca. 2 cm longo, setis uniformibus, capillaribus, minute barbellatis, in circulo affixis.

TYPE: shrub 1-2 dm high, leaves coriaceous, densely tan-tomentose beneath, bracts reddish, tomentose, corollas bright orange-red, common in low scrub bush, slopes vicinity Cumbre Camp at 1700 m alt., Cerro de la Neblina, Amazonas, Venezuela, January 4, 1954, *Maguire, Wurdack & Bunting 37027* (NY). Paratypes, Cerro de la Neblina, *Maguire, Wurdack & Bunting: 37004, 37089, 37126, 37149, 37190*.

Distribution. Known only from the cumbre of Neblina, where *G. rhodanthum* is

a branched shrub from 1-20 dm high, upright in thickets and protected areas, often depressed on wind-swept sites.

Three genera of Guayanan Mutisieae, viz., *Quelchia* with regular corollas, and *Achnopogon* and *Neblinaea* with bilabiate corollas, have laterally disposed, axillary, compound inflorescences. Peculiar to the three genera (ours), the central axis is monopodial, continuing to grow vegetatively. All other members of the Guayan Mutisieae have large massive many-flowered heads that seem to terminate the axes, hence the stem development is sympodial. The large, relatively massive, solitary heads of *Glossarion* seem to be axillary and lateral, the central axis thereby being monopodial, as is characteristic of the lianoid genus *Mutisia*.

This, if accurately interpreted, cuts across the otherwise prevailing correlation of monopodial development and compound laterally disposed inflorescences on the one hand, and sympodial development and large solitary heads on the other.

*Gongylolepis benthamiana* Rob. Schomb. var. *pubescens* Maguire & Wurdack, var. nov.

Var. *benthamianae* similis sed ramis foliisque et axibus inflorescentiarum dense sericeo-tomentosis, demum plus minusve glabrescentibus; paniculis multicapitatis, capitulis 12-15.

TYPE: shrub or small tree to 5 m high, extreme pubescent form, rocky slopes and elevations, savannas, north side of Río Apongua, Gran Sabana, at 1200 m alt., Edo. Bolívar, Venezuela, March 27-28, 1952, *Bassett Maguire* 33640 (NY).

Typically *G. benthamiana* is glabrous and has fewer than eight heads. The new variety is fairly common in the type locality, and seems to be the prevailing form there.

*Gongylolepis huachamacari* Maguire subsp. *neblinensis* Maguire & Wurdack, subsp. nov.

Subsp. *huachamacari* similis sed ramis glabris vix pilosis in axillis foliorum; foliis angustioribus 7-12 cm longis, 15-25 mm latis; inflorescentiis pervalde corymbosis non umbellatis; corollis antherisque flavidis non purpureis.

TYPE: small tree to 4 m high, involucre bracts maroon, corollas and anther tubes cream-colored, styles maroon, locally frequent, intervalle beyond Ridge No. 3, Southwest Escarpment at 1800 m alt., Cerro de la Neblina, Amazonas, Venezuela, January 20, 1954, *Maguire, Wurdack & Bunting* 37353 (NY).

*Neblinaea* Maguire & Wurdack, gen. nov.

Capitula parva, 2-5 flora, homogama, in cymis lateralibus dispositis; involucro anguste cylindrico; phyllariis multiseriatis (12-15) gradatis, oblongo-oblancoelatis vel oblanceolatis, pergamentaceis; receptaculo parvo hemisphaerico epaleaceo hirsuto, minute carnososquamuloso; corollis submembranaceis bilabiatas, tubo 5 (8)-nervato, labia exteriora aliquantum arcuata minute 3-dentata, 6(8)-nervata, labis interiora profunde 2-partita, lobis linearibus valde circinnatis, 2-nervatis; antheris caudato-sagittatis, appendicibus apicalibus anguste triangularibus, appendicibus caudalibus dense puberulis adjacentibus connatis; granis pollinis luteis, tricolpatis, sulcis longiacutis, granis subprolatis, spinulosis, axibus polaribus ca. 50 $\mu$ ; achaeniis plus minusve angulari-teretibus, obscure 5 (10)-costatis, annulo non evidenti, disco pappifero evidenti, pappo pauci(3)-seriato, setis filiformibus minute barbellatis. Frutex ramosus; foliis oblanceolatis chartaceo-coriaceis, reticulato-pinninervatis, plus minusve sessilibus.

TYPUS: *Neblinaea promontiorum* Maguire & Wurdack.



*Neblinaea promontoriorum* Maguire & Wurdack, sp. nov.

Frutex ramosus, 1-2 m altus; ramulis teretibus 3-4 mm diam., internodiis 1-3 mm longis, dense fulvo-sericeis; foliis oblanceolatis, semisessilibus, moderate chartaceo-coriaceis, pinninervatis reticulatis; laminis (2) 4-8 cm longis, (0.6) 1.0-1.5 cm latis, apice obtuso, basi acuminata, costa prominenti, venis prominulis; petiolo alato, 2-4 mm longo; inflorescentiis lateralibus, in axillaribus foliorum dispositis, cymosis 2-6-capitatis, ramulis 1-2 cm longis pubescentibus bracteatis, bracteis lanceolatis acuminatis, 3-4 mm longis, caducis; capitulis anguste cylindricis, 2.0-2.5 cm longis, 3-5 mm latis, phyllariis 12-15-seriatis, pergamentaceis, fulvo-ciliatis, ad basim improminule 7 (9)-nervis, inferioribus triangulari-ovatis, 3-4 mm longis, acutis minute ciliolatis, mediis oblongo-oblanceolatis, 6-8 mm longis, 3-4 mm latis, apice acutiusculo; receptaculo hemisphaerico ca. 1.5 mm diam., sparse hirsuto, epaleaceo, aliquantum alveolato minute carnososquamuloso; floribus 2-5, corollis submembranaceis bilabiatis, tubo ca. 6 mm longo, supra ca. 1.5 mm diam., 5 (8)-nervato, lobo posteriore 7-8 mm longo, ca. 3 mm lato, late elliptico, minute tridentato, 6 (8)-nervato; lobo anteriore profunde bifido, segmentis linearibus 6-7 mm longis, ca. 0.6 mm latis circinnatis, 2-nervatis, apice acuto; antheris ca. 9 mm longis, appendicibus apicalibus anguste triangularibus, ca. 0.5 mm longis, appendicibus caudalibus ca. 2 mm longis, dense puberulis, linearibus acutiusculis adjacentibus connatis; filamentis 2.5-3.0 mm longis, in tubo affixis; stylo 13-14 mm longo, ad basim bulboso, ramulis ca. 1 mm longis, rotundatis, glabris, non differentiatis; achae-niis 6-7 longis, plus minusve angulari-teretibus, 5 (7)-nervatis, exannulatis vel minute annulatis, minute coronatis; pappo fulvo, 11-13 mm longo, setis 3-seriatis, filiformibus, numerosis, minute barbellatis, in disco 0.5-0.6 mm alto dispositis.

TYPE: branched shrub 1-2 m high, inflorescences lateral and axillary, flowers 3-5 per head, white, frequent in low scrub vegetation, West Escarpment, Cerro Neblina, at 1850 m alt., January 10, 1954, *Maguire, Wurdack & Bunting 37009* (NY). Paratypes: shrub to 2 m high, flowers 2-5, white, frequent along escarpment at 1900 m alt., 5 km west Cumbre, Cerro Neblina, January 10, 1954, *Maguire, Wurdack & Bunting 37016*; shrub, frequent, along West Escarpment at 1800 m, Cerro Neblina, January 6, 1954, *Maguire, Wurdack & Bunting 37082*.